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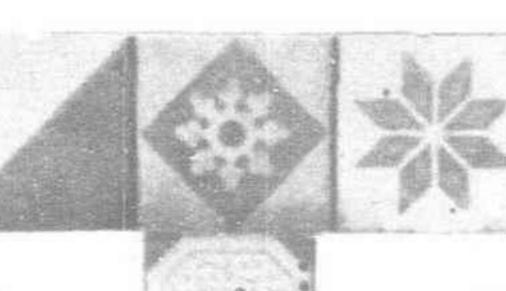


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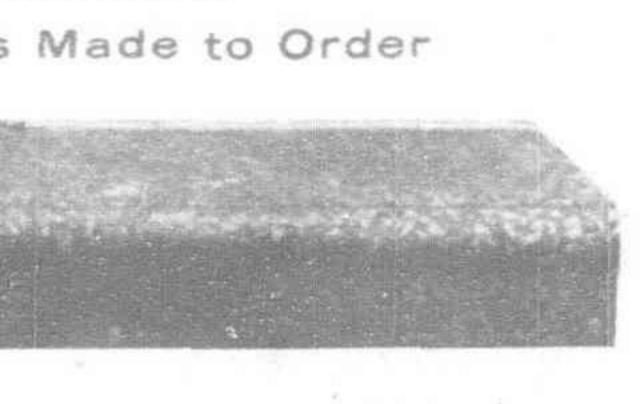
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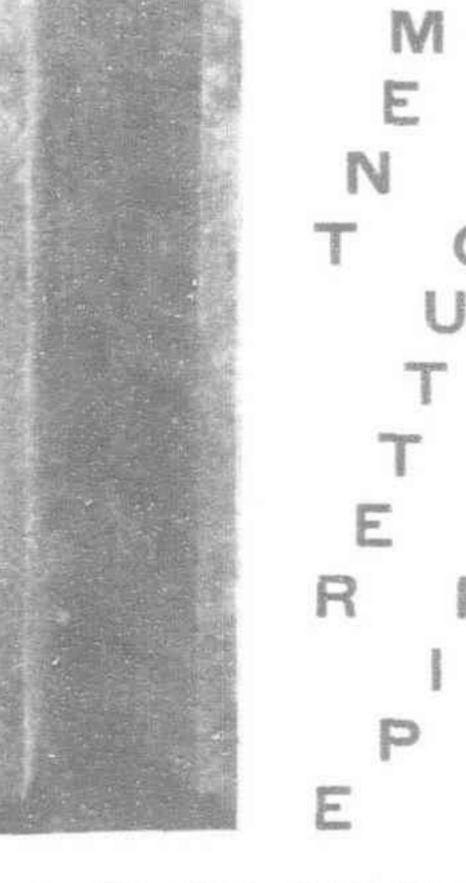
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THE FAR EASTERN REVIEW

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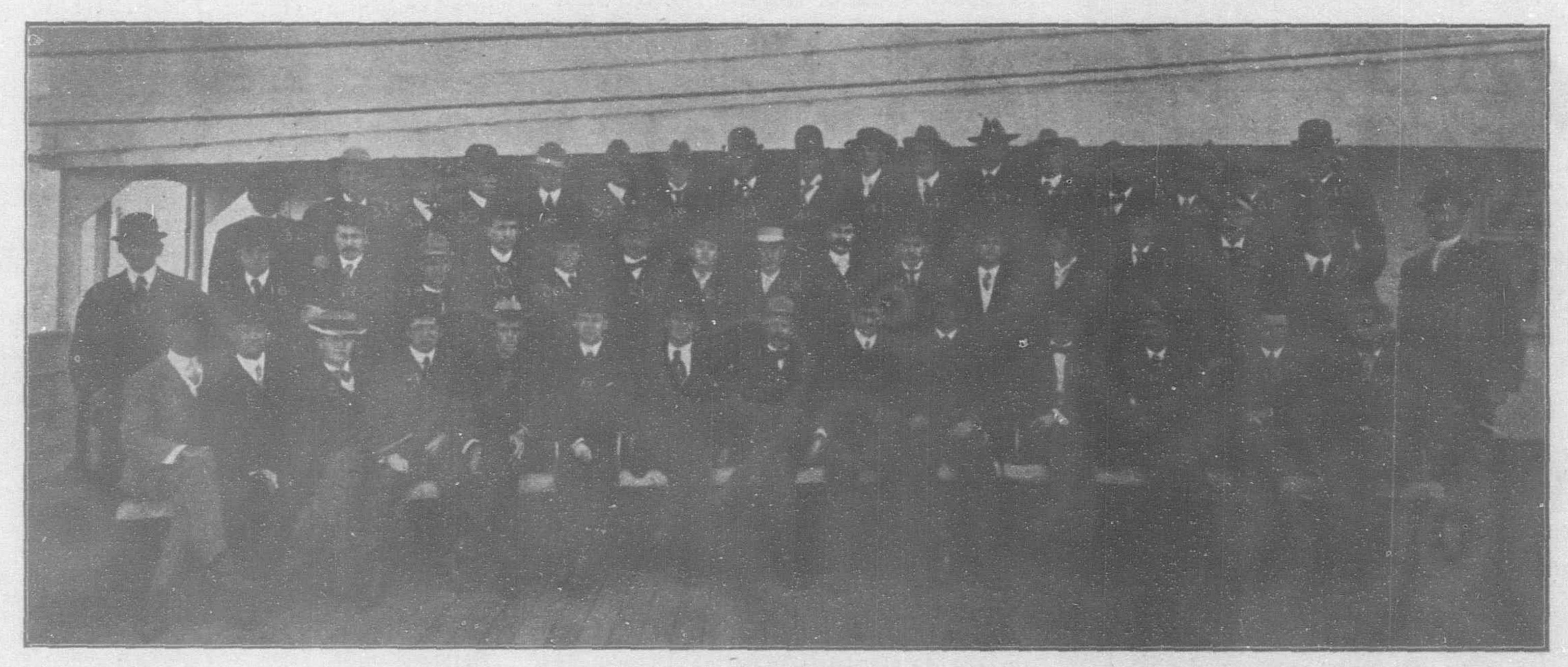
ENGINEERS BEGIN THE SURVEY OF RAILROAD ROUTES IN PANAY, CEBU AND NEGROS, P. I.

The field corps of civil engineers sent out to the Philippines from the United States by Messrs. J. G. White & Co., Inc., of New York, London and Manila, which firm is under contract to construct railroads on the islands of Panay, Cebu and Negros for the Philippine Railway Company, under government concessionary grant, has established headquarters in Manila, and the locating parties have proceeded to the islands in the S. where their future operations will be carried on. The party was transhipped

approximate 400 ms. Eight thousand tons of steel, enough for 80 ms. of construction track; six locomotives for construction work, and the steel work for bridges were ordered by the chief engineer of construction before he left New York. The cost of the work so far provided for approximates \$14,000,000 gold, and it is expected will require 4 yrs. to complete, owing to the conditions incident to the country, the principal obstacle to rapid work being the rainy season which greatly reduces the number of working days

the construction from the very beginning both in the field and in the matter of furnishing available materials. This is a policy which the Philippine Railway Company insists upon and which will be complied with carefully where the exigencies of the construction warrant. It is intended to construct 100 ms. of line per year.

HEADS OF THE CONSTRUCTION.—The construction of these railroads will finally be up to the Philippine Civil Commission, Mr. F. A. Molitor, M. Am. Soc. C. E., railway con-



LOCATING ENGINEERS ON BOARD THE SS. "MINNESOTA," MAY 28TH.

KEY TO THE PICTURE:—(8) E. J. BEARD, Chief Engineer.—(7) L. E. BENNETT, Right-of-Way Agent.—(12) J. M. Robinson, (10) C. H. FARNHAM, (9) H. F. Howe, (6) C. J. Hogue, (11) F. D. Nash, (5) R. F. Ricker, Chiefs of Parties.—(4) B. B. Harris, Office Engineer.—(24) C. B. Sawyer, Chief Clerk.—(25) J. W. Krueger, Cashier.—(26) E. W. Brammert, Private Secretary.—(23) A. W. Hilton, Chief Stenographer.—(19) Walt. Dennis, (18) George L. Judson, Office Draftsmen.—(14) D. A. Calhoun, Assistant Chief of Party.—(2) C. J. Cassbay, (1) R. L. Cooper, (3) T. W. Tiegen, (13) G. B. Kierulff, Transitmen.—(34) E. C. Alexander, (37) T. C. Edminster, (30) R. M. Elder, (28) H. C. Hill, (40) H. J. Kennard, Levelmen.—(41) Clay Anderson, (27) W. P. Miller, (45) J. C. Mulder, (29) F. S. Weston, Topographers.—(31) W. A. Reagan, (46) L. C. Stiles, (38) G. W. Todd, (21) J. P. Worthington, Field Draftsmen.—(48) F. A. Hatch, (35) H. B. Hull, (17) P. M. Poynter, Assistant Topographers.—(20) Herman Gard, (44) D. C. Hayne, (42) A. W. Hippe, (36) C. S. Kalbfell, (16) H. L. Pringle, Rodmen.—(33) L. H. Johnson, (47) E. W. Mitchell, (15) E. De Mitkeiwicz, (43) L. M. Newton, (39) A. L. Oliver, Head Chainmen.—(32) Charlie Bennett, (22) J. F. Lineham, Tapemen.

to the China Navigation Company's steamer Tean at Hongkong from the Great Northern Steamship Company's Minnesota, which brought it out from Seattle, arriving in Manila June 8th. The party includes field engineers, office engineers, cashier, clerk, stenographers, etc.; in fact, the nucleus of a complete organization, which, when finally completed, will comprise a total of about 50 men. This force will be followed later, as construction progress requires, by such supervisory forces and skilled labor as can not be supplied by the Filipinos, which will be the labor exclusively employed in the construction of these roads. The aggregate length of the railroads in these islands will

per annum. The unusual conditions connected with an undertaking of this nature in the Orient create for an engineer extremely interesting work, and each member of the party is in high spirits and much delighted with the prospect of the problems before him. It is announced by the chief engineer that he will purchase all the supplies that can possibly be furnished in the Philippines and the Orient. He expresses the hope that the Philippines will be able to furnish all the timber necessary, and prices and other conditions being equal he promises to give the local markets preference over outside markets. As far as possible the Filipinos will be given an opportunity to benefit by

sulting engineer to the commission, and Mr. E. J. Beard, M. Am. Soc. C. E., of Kansas City, Mo., chief engineer of construction for the contracting firm. The latter gentleman has exclusive authority over the work, which includes the purchase of all materials. Both Messrs. Molitor and Beard are expert railroad engineers of many years' standing, and they come to the Philippines with records that bespeak for the work in hand prompt and efficient despatch. Mr. Beard has gathered about him a corps of engineers who have made railroad construction a study, many of them having worked in more difficult fields

(Continued on page 5.)

THE FAR EASTERN REVIEW

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MANILA, SHANGHAI AND YOKOHAMA, JUNE 1906

AMBASSADOR LUKE E. WRIGHT

The first 5 yrs. of American civil government in the Philippines will end with the dawn of Independence Day of this year. Some years hence, when the cooling influence of distance shall dissipate the mists of passion enveloping contemporaneous facts and they shall stand forth in their true proportions, the history of that period will be written. When the historian takes up his task, upon no pages will his pen dwell more extensively or approvingly than upon those recording the acts of the man who, for more than half that lustrum, stood at the helm of the insular administration—General Luke Edward Wright.

In commemoration of this half-decade and of the recent deserved elevation of our first Governor-General to the post of first American Ambassador Extraordinary and Plenipotentiary to the court of His Imperial Japanese Majesty at Tokyo, The Far Eastern Review, dedicated as it is in part to the industrial development and advance of the Philippine Islands, publishes, in the supplement to this number, a fine halftone cut of the new Ambassador who was, while he was with us, the decided champion of the cause we espouse.

To properly review the official career of our first Governor-General during the 5 yrs. he spent in the Islands, for more than 2 yrs, and 10 mos, of which he presided over governmental affairs, would be to recall a tempestuous formative period and evoke acts and scenes in which he was the central figure.

General Wright arrived in the Philippines as a member of the second or so-called "Taft Commission" on June 3d, 1900. Fifty-four years of age, with a vigor of mind and body acquired on the field of battle and in the arena of the forum, he brought to his new duties a ripeness of experience and judgment that boded well for the future. As a Confederate artilleryman he had fought through the Civil War. He served for 8 yrs. as the Attorney-General of his native state, Tennessee. He was a leading member of the Memphis Bar. The yellow fever scourge of 1878, which laid its desolating hand on the city of his birth, found him, in the very vortex of its attack, fighting its advance and ministering to its victims.

He gave a deep study to the Philippine problem, and, on reaching a conclusion, adhered to it during his stay in the Islands. He felt, as we do, that the archipelago was practically a virgin field; that the possibilities for development along commercial, industrial and agricultural lines were almost limitless. He was early convinced that what the Islands needed was commercial, industrial and agricultural regeneration and that this could not be effected without vouchsafing equal opportunities for all. This had been the experience of the United States, and he felt certain it was the only possible solution here. The Constitution under which he was born claimed this as a basic principle. He announced his platform in his first public speech in the Islands, delivered on the Luneta in Manila February 22d, 1901, and from it he never departed. It becan a the leading principle of his administration as Civil Governor and Governor-General.

Those among the natives who were opposed to him thought to see in his attitude a departure from Governor Taft's famous shibboleth, The Philippines for the Filipinos. Nothing more erroneous. In his inaugural address as Civil Governor, delivered in the Marble Hall, Ayuntamiento, February 1st, 1904, the distinguished Tennesseean said:—

It seems to me desirable, therefore, at the earliest opportunity to emphasize the fact that the wise, humane and patriotic principles which controlled the administration of Governor Taft will not, at least consciously, be departed from by me.

And they never were.

Near the end of that luminous document, Governor Wright explained what he meant by his Equal rights for all. He said:—

Every intelligent Filipino will realize that his people in their present stage of development are unable to stand alone, and that, in the very nature of things, they must lean upon some stronger arm. It is suicidal, therefore, to repel friendly advances made by those in authority, or to engage in a policy of destruction. * * * The coming of Americans to these Islands to build railroads and other works of public utility, to engage in agriculture, manufacturing or the mechanical arts, can only be of advantage to the Filipino people. There is room in these beautiful and fertile Islands for all. The door of equal opportunity should be thrown wide open for all alike—Europeau, American and Filipino.

Fitting words, these, from a descendant of the hardy pioneer of the West who helped carve an empire out of Nature's raw material, and who welcomed every hand that added to the results sought, no matter whence it came.

That the Governor was right in his statement that Filipino can not stand alone, is borne out by the fact that barely a day passes that the native press does not deplore and attack the inertia of the people and, principally, the unwillingness of the monied Filipinos to furnish funds, individually or in combination, for the purpose of furthering great public or other works. A considerable portion of the population—if we may judge from the native press comments—is opposed to immigration of any kind. For some time it has been discussing academically and nurturing what it is pleased to term the Filipino Soul-whatever that iswhich is apparently so weak and puny that it fears total destruction if modern ideas and methods are allowed to spring up in its bailiwick. This element is evidently opposed likewise to the contention of a modern Spanish philosopher who holds that there is no people that can preserve its nationality by isolating itself; that those who are always on the defensive perish in the end. It would be well if the

native press would take to heart this same philosopher's words when he says:-

At the outset I may be exasperated at him who comes to me with the intention of saving me, even against my will; but, as soon as I reflect, I must be grateful to him on seeing that he considers me as a brother. On the other hand, I can never conceive affection for the trader who leaves me as I am, and who respects even that which he thinks most pernicious in me, so long as he can exploit me and hold me as a customer.

This is the principle that inspired all of Governor Wright's actions while here. Faithful to his intention to do all that he could to benefit the material progress of the people of the Islands, which he believed, with all friends of the Filipinos, must be first secured before the great political end sought could be attained, he spared no pains in the Islands and in the United States to bring about legislation and awaken interest favorable to his purpose. He spent the whole of his two vacations in the United States knocking at the door of Congress for recognition of the rights of this people in matters financial and commercial.

In October, 1902, after having acted as Civil Governor for over 10 mos, during the illness and absence of Governor Taft, and having conducted affairs during the terrible cholera scourge of the spring of 1902, he visited the homeland for vacation. He, however, enjoyed but little leisure. During the entire LVVIIth Congress, from December, 1902, to March, 1903, he gave his time and labor to securing legislation of the greatest importance to the welfare of the Filipino people and the business prosperity of the Islands. He was largely instrumental in securing the passage by Congress of three measures of great benefit to us. They were the Currency Bill, the Constabulary Bill and the \$3,000,00 Agricultural Relief Bill. When he returned to Manila April 30th, 1903, he was most warmly and enthusiastically received by the people of Manila.

Just prior to the departure of Governor Taft to assume the office of Secretary of War, on December 22d, 1903, Governor Wright again took the reins of government in hand in the capacity of Acting Civil Governor. On February 1st, 1904, as we have stated, he was inaugurated Civil Governor.

In the closing months of this year occurred the ladron outbreak in the provinces of Cavite and Batangas. Montalon and Felizardo, with some five or six other bandit leaders, made assaults on Taal, Batangas, San Francisco de Malabon, Cavite, and other pueblos. Governor Wright had felt for several months that the conditions in the two provinces were reaching an unbearable stage, but wished to give the local authorities every opportunity to deal with the situation. When they clearly showed their inability to cope with it, and peaceful citizens clamored for protection in their persons and property, he felt that his duty to the people demanded prompt, firm and decisive action. As a soldier he knew that in such junctures an ounce of lead is worth a ton of argument. The peaceable citizens would have to suffer the inconvenience of a military campaign. His aim was to make their suffering as short as possible. The Philippine Commission authorized and Governor Wright proclaimed the suspen sion of the writ of habeas corpus in both these provinces on January 31st, 1905. By the employment of United States troops, Philippine Scouts and Philippine Constabulary, and rigid measures, the necessity of which he deplored as deeply as could any one, in a few months the atmosphere was cleared and the peaceably-inclined could engage again in their daily vocations unhampered. The suspended writ was restored on October 19th, 1905, although active operations had ceased some time before.

Some months previous, on February 6th, 1905, by Section 8 of the "Cooper Bill," enacted into law and approved on that date, the designation of the Civil Governor was changed and General Wright became the first American Governor-General of the Islands. The Secretary of War, on the following day, cabled as follows:—

WRIGHT, Manila.—I salute and congratulate the first American Governor-General of the Philippine Islands, and wish for him the same success which has attended his administration as Civil Governor.—(Signed) TAFT.

The Secretary's wish was echoed by all those who had the true interests of the Islands at heart. And who are they? Those who waste their time and those of their countrymen entoning dithyrambs and tropes to the Filipino Soul, while fields lie fallow and bare? Those who cleave the ambient with fustian shouts for immediate independence, when warehouses are empty and ships are rotting at anchor? Those who with folded arms and dreamy eyes look to Providence or the Government to reap a miracle of the Heaven-sent manna, while industries languish and the song of the sickle is hushed? Or are they those who, like our late Governor-General, bend every nerve and effort to bring about progress, prosperity and plenty through the fostering of every measure that tends to bring hither the Archimedean lever of capital to uplift from their present prostration the industrial, commercial and agricultural interests of the Islands?

Ambassador Wright, while a member of the Philippine Commission, Secretary of Commerce and Police, Civil Governor and Governor-General of these Islands, more than any other one man, devoted his time and attention to the furtherance and promotion of those interests which THE FAR EASTERN REVIEW covers and claims as its particular field. What he sought was better roads, better fields, better homes, better tools, better shops, better ships, and more and better harbors and other public works-the harbingers and champions of better times. In his endeavor to bring these about, he advocated everything that would make them possible, and deprecated everything that would retard their advent, such as political unrest, vain repining and rainbow chasing.

It has been said by some of the natives disaffected because of the Internal Revenue Law, that General Wright was responsible for its allegedly onerous provisions. Those who are in the best position to know affirm that nothing could be more erroneous. Champion as he was of the upbuilding of existing and the introduction of new industries, he it was who by his arguments and influence with his fellow members of the Philippine Commission succeeded in removing many a sting from the measure before it was enacted into law.

When the history of the legislation of these first 5 yrs. of civil régime is written, the name of Luke E. Wright will figure as the author of many excellent laws, all tending to improve the material condition of things in the Islands. Space forbids enumerating them.

Always modest, self-effacing, generous, kindly, truth-loving, he will be long remembered by those whose destinies were in his hands for many years. Although an orator of sound and persuasive periods, he was preeminently an advocate of action. In the homely phrase of our native land—so discomfiting to the voluble—he was the apostle of Stop talking and go to work.

THE FAR EASTERN REVIEW extends its congratulations to the new Ambassador and to the great American people he so worthily represents at the court of the Mikado, and wishes for him in his mission the success which his high character and purposes must achieve if allowed untrammeled play.

OUR SHIPBUILDING INDUSTRY

During about 14 mos., ended December 31st, 1905, shipowners in the Philippine Islands spent something like \$\mathbb{P}\$450,000 (\$\mathbb{P}\$225,000 gold), to foreign dock companies for ship repairs alone, probably every dollar of which might have gone to the local shipyards and marine repair concerns had it not been for the discriminating and insurmountable tariff wall which shuts in and paralyzes their industry.

In our May issue we published an editorial in which we pointed out the disadvantages under which the insular concerns are operating. Since then we have secured a partial list of the privately-owned vessels that have been sent abroad to be docked, overhauled and repaired during the period above mentioned for the sole reason that the local companies were unable to meet this China Coast competition. These vessels represent the expenditure of that \$\mathbb{P}450,000\$, and are as follows:

—SS. Venus, Ban Tek, Butuan, Dos Herma-

nos, Montañas, Magallanes, Atlantas, Iruña, Juno, Fernandez Hermanos, Romulus, Legaspi, and Tayabas, the schooner Kodiak, and the barkentine Alta. The spirit of loyalty to home enterprise prompted the shipowners first to offer the work to the local concerns, but in every case the China Coast shipbuilders stepped in with figures which meant the saving of thousands of pesos to the owners by sending the work abroad, and in business, as well as in life, the first law being self-preservation the owners were compelled to send their ships away. The local concerns appreciated the situation and could not complain against the principle involved.

It is impossible for us to get figures covering the repairs that have been made on the China Coast in army transports, the American warships in these waters, and the coast guard cutters of the civil government; yet it is safe to say that more than double \$\mathbb{P}_{450,000}\$ has gone to foreign ports when most of that vast sum might have remained in the Philippines had conditions been such that the insular companies could have met the competition on a fair basis.

fair basis. Taking into consideration the present deplorable state of the industry in the Philippines, therefore, and knowing that something should be done immediately to resuscitate the business, we most earnestly urge the concerns interested to get together and devise some plan for relief. We believe the Philippine Commission would welcome a tangible proposition that would have for its object the restoration of the industry to prosperity. This would mean much to Manila, Iloilo and Cebu, because with all the plants running to their fullest capacity there would not only be plenty of labor for mechanics and other workmen but thousands upon thousands of pesos that are now being withdrawn from local circulation to meet the demands of the China Coast concerns would remain here, thus adding to the general stability of business. There are great possibilities here for shipbuilding and marine repair work under regulations that would insure fair competition, and it seems a pity that tariff laws ignorantly applied by the far-away congress at Washington, as they are in this case, should be the stumbling block to progress and prosperity in this line.

JAPAN, THE ENGLAND OF THE FAR EAST

Mr. Miller, American Consul-General at Yokohama, in a recent report to Washington, says:—

The chrysalis of Japan's commercialism and industrial life has broken the cocoon of opportunity, and she is reaching out towards the consummation of another hope—leadership in the trade of the Far East. *** The Government is refunding its debt at less than 5 per cent, every industry needing help is specially aided and assisted by the Government, as an instance of which, all the match, factories are merged under an imperial license, and paternalism is becoming the keynote of the empire's future progress. The Japanese chambers of commerce in convention call for consolidation of banking houses, an extended consular service, and floating museums to exploit Japan abroad.

Government ownership and direction of public utilities and manufacturing is not a new idea in Japan. Under the feudal system of old Japan it was exercised in the broadest possible sense. Now this is exactly what the government is doing today. It is working in a broader way, however. It does not exact direct tribute, as in the olden times, and the producers receive better returns for their labor. But none the less the government is exercising a supervision over all the industries it does not control and fostering in every way the development of new ones. This application of government concern in an industrial sense is what is making Japan industrially and commercially strong. As is well known the government controls today many of the important monopolies. A large percentage of railroads, the telegraph and telephone lines, the salt works, the tobacco monopoly, and the camphor production are directly under the control of the government. Following is a list of the factories conducted by the government:-Printing Bureau, which includes printing, type foundry and paper mill; mint; Tokyo arsenal; Osaka arsenal; Senjii woolen factory;

canning factory; clothing stock; surveying and map drawing; Yokuska shipyard, dockyard, and arsenal; Kure shipyard, shipbuilding, ship engine, and arsenal; maizura shipyard, shipbuilding, ship engine, and arsenal; naval arsenal; Shimose powder works; Takeshiki dockyard; Ominato doekyard; steel works; telegraph and light-house stores, and railway works.

Thus we find in the case of contending business concerns the force and power of the government in recommending a combination of interests, to the end that all may live and the industry prosper from concentrated effort. This we find exemplified in the recent combination of the various match-making concerns. The government viewing the warring competitors, steps in and advises the formation of a trust. The business is put under the license system, and the government promises in consideration of the combination, the issuance of an imperial license, which virtually shuts off competition, and incidentally puts the industry directly under the control of the government.

As a further illustration of how closely the government guards the interest of the people in industrial matters, it might be well to cite the case of the *Use of Fertilizers* by the department of agriculture. This branch of the public service undertakes and does examine scientifically and from an economic standpoint, the value of the different fertilizers imported, and advises the farmers as to their relative value and utility. The importation of fertilizers is one of the most important items in Japan's commerce, and here again we see an illustration of the power of the government.

Throughout the empire there are banks known as hypothec banks. It is the business of these to advance money on growing crops or help financially in the development of some industry. These are similar banks to those which obtain in the United States, with this exception—the government is indirectly represented in the directorate of these banks and sees to it that they do not want for financial assistance in time of need. This evidences in another and more potent way the work of Japan in the development of her industries.

More important, however, than the hypothec

banks is the great Industrial Bank of Japan. This bank was established in April, 1902, with a capital of \$4,980,000. Besides doing a general banking business, this institution makes loans, takes up public loan bonds, local loan bonds, company debentures, etc. In order to enable it to obtain the necessary amount of capital, the bank is authorized to issue debentures to an amount of five times its paidup capital (which is \$1,245,000 gold). The first five yrs.' dividend of 5 per cent of its paidup capital is guaranteed by the government. It is interesting to note, in this connection, the recent action of the board of directors of this bank in furtherance of the general plan of increasing the capital of the country for the purpose of commercial and industrial development. The general outline of the plan is to induce leading financiers abroad to have direct interest in the bank by becoming shareholders to the extent of \$3,750,000 gold out of \$8,750,000. The authorized capital of the bank, as stated above, is \$4,980,000 gold, divided into shares of \$50 each. It is intended to change these shares into \$25 shares, making the total number of shares owned by the Japanese shareholders 200,000. Over this \$3,750,000 gold capital, divided into 150,000 of \$25 shares, is to be increased and to be owned by leading financiers abroad. By this arrangement the Industrial Bank hopes to become an international institution, which will be of general utility both to foreign investors and to various enterprises in Japan. It is understood that England subscribed to the full amount of the shares offered for foreign purchase, and that the capital realized from this sale, amounting to \$3,750,000 gold, has been spread throughout the Empire in diversified industrial projects that give promise of large returns.

In line with her unusual activity on land is the determined effort to increase the efficiency of her merchant marine. Only the other day the newspapers heralded the fact that one of the subsidized lines—the Toyo Kisen Kaishahad made an effort to purchase the entire equipment of one of the American Pacific steamship lines. That the government is fostering this there can be no doubt. The influence of the government is felt in all lines of commerce and industry. Such paternalism exists that no one in business, pressed by the exigencies of the times, hesitates to call upon banks indirectly controlled by the government for assistance. In fact, the commerce of Japan to-day is almost entirely supervised by the government. What such an ownership or control forebodes in the struggle of nations for the commerce of their people only the future can determine.

Considering, for the nonce, the general subject of government ownership and supervision, one would think such a transaction would engender bitterness among the people. This, however, is not the case. The old system under the Shogunate is of too recent date to stir up much opposition, and, then, the people feel an absolute security in the integrity of the government and give to it all the earnest support and assistance they can render. The change has been gradual, and, more important than all, the people have prospered under it more than at any other time in their history. It is no wonder, then, that government ownership and direction is invited in many lines.

Against this government ownership of industries and paternalism, however, there is some opposition, which appears to be growing. This is instanced at the meeting held at Tokyo October 10th, last, at which all the chambers of commerce of Japan were represented. Among other important resolutions passed was one which set forth that government monopolies such as tobacco, salt, camphor, etc., are desirable neither as a government resource nor as bettering the industry. The salt monopoly first of all should be abolished as soon as some other resource is found and there should be no other government monopoly. What effect, if any, these resolutions will have upon the government is not known.

The development of the people generally and the consequences of increased trade has brought about substantial increases in the matter of wages, and the whole empire to-day is enjoying a prosperity in this line greater than it has ever known. But even with the material advances that have been noted during the past few years, the pay of the average workingman is but a small percentage of what their more fortunate American brothers receive. The simpler mode of living, the few necessities, and the relative cheapness of food stuffs and clothing are the principal factors in this equation. Following is a table giving the average daily wage (in United States currency):—

in United States currention	1887	1897	1903
Carpenter Stonecutters Brick worker Bricklayer Mat worker Cabinetmaker Wooden-shoe maker Leather-shoe maker Blacksmith Potter Shipbuilder Farm laborer (male) Farm laborer (temale) Silk spinner (temale) Day laborer	.12 .07 04	.16 .19 .20 .45 .22 .15 .08	.3

Japan is attracting the attention of the world to her porcelain products. The industry is one of the oldest in the empire, having come from China centuries ago. But it has only been in recent years that Japan has exported this line of merchandise to any extent. The combination of oriental with occidental ideas has developed an article which finds a ready sale in the markets of the world. Many fine imitations of French creations are made and largely sought. Among other considerations, the introduction of foreign machinery in at least two of the large porcelain factories has been responsible for the growth of this industry. Most of the factories, however, employ the crudest means in the manufacture of porcelain, even molding by hand, and the percentage of damaged goods due to imperfect molding cuts quite a

figure in the account. But sooner or later the principal factories must adopt up-to-date methods if they would keep pace with the more progressive manufacturers. The spirit of combinations in this line is pervading the Empire and many of the smaller producers are under the direct control of large concerns.

Japan with her limited territory and nearly 47,000,000 of people, requires much in the way of imports, and coincident with the development of the empire and the advancement of the people, will for many years require more and more in the shape of foreign-made articles. Foreign manufacturers will find in some lines that Japan will be able in a few years to make herself independent of foreign-made goods. This will doubtless be evident first in the manufacture of cotton yarn and fabrics, and the commercial world will first be convinced of Japan's commercial development in this line.

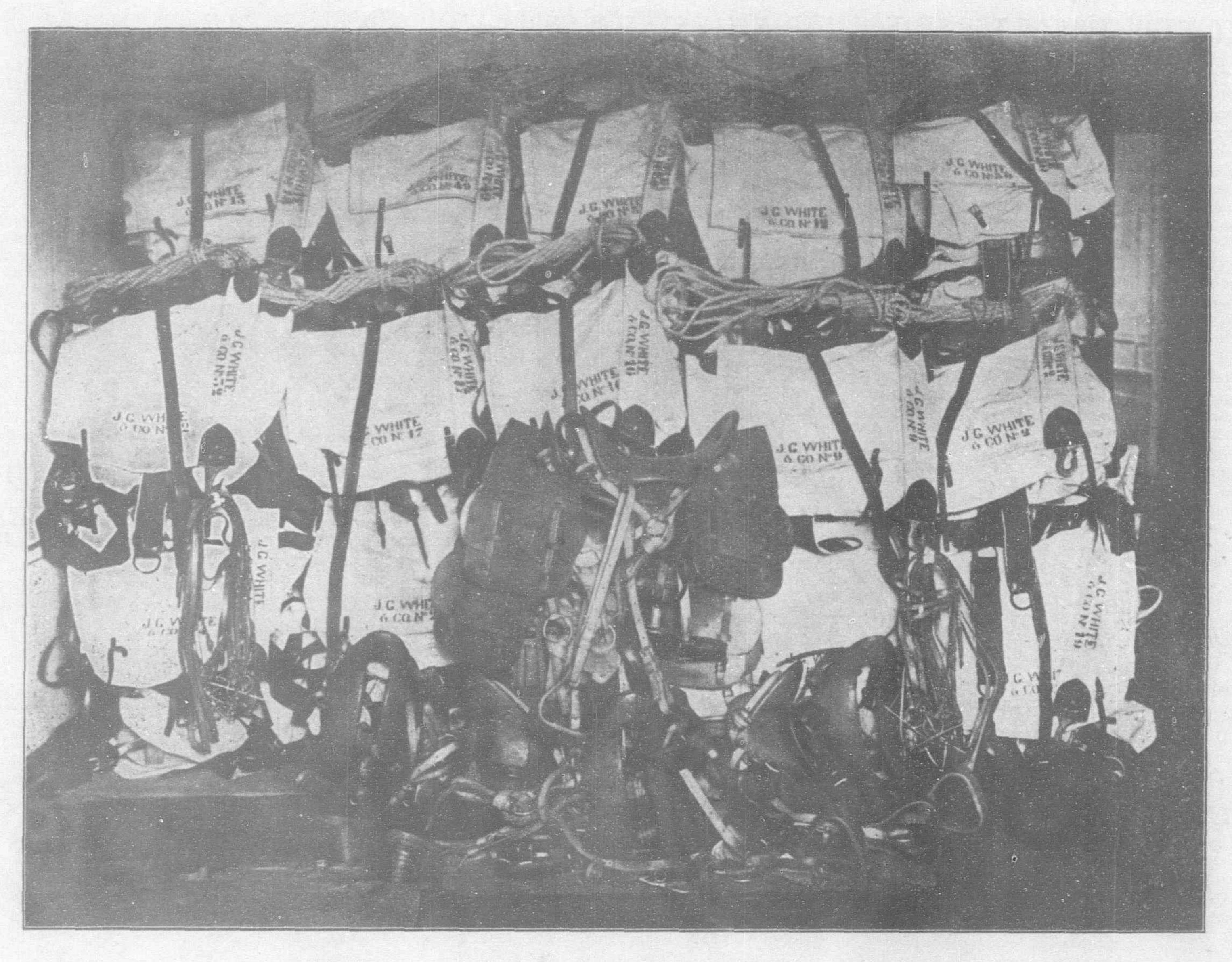
Japan's commercial development in this line. Few industries in Japan have shown a more substantial growth than the manufacture of cotton yarn and fabrics. Throughout the empire cotton mills are being erected, and late reports indicate material growth in all lines manufactured. To-day Japan is able not only to supply her own wants in a large measure, but is reaching out for the control of the cotton yarn and fabric market of China, which has long been one of our manufacturers' best customers for cotton goods. Japan is at present dependent upon the United States and India for her raw cotton. She has neither the domain nor the climate necessary to produce cotton in large quantities. But Japan's influence will be keenly felt in the sale of cotton yarn and fabrics. She is better qualified to supply the oriental demand for cotton goods than any other country. She knows and understands the wants of her people and those generally of the Far East, and is preparing to furnish them. This, added to her geographical position, will make her a dominant factor in the cotton trade of the Far East. In this connection it might be well to consider what Japan has been doing for herself. In 1902 the cotton fabrics imported in the shape of prints amounted to \$1,301,016 gold; in 1903 this amount had been reduced to \$987,688, while for the year 1904 they fell to \$266,046. These figures indicate that Japan is already beginning to supply her own people with this class of merchandise. The imports of ginned cotton, on the other hand, have shown an increase. In 1903 they amounted to \$34,103,362.50 gold, while for 1904 they increased to \$35,733,422. Leaving out of consideration her home consumption, Japan exported to China in 1895 cotton yarn to the amount of \$517,239 gold. Last year, not withstanding the demands of the army for cotton goods, such as khaki clothing, blankets, shirtings, and socks, her exports of cotton yarn increased to \$14,634,288 gold. In other words Japan has been supplying China with the material to make her cotton goods, and is now seeking to increase and develop this trade by producing a finished article which will meet the demands of the Chinese in quality and cheapness. Take the subject of cotton blankets as another illustration of the development of the cotton industry. In 1896, when Japan first began the exportation of this article, she sold \$60,297 gold worth in the markets of China and Korea. In 1904, notwithstanding the demands of the army, which were enormous, the exportation of cotton blankets had risen in value to \$1,779,449 gold. As another evidence of the satisfactory condition of the cotton industry in Japan, it might be pertinent to state that all the spinning mills are flourishing. Increased dividends to stockholders are the rules and many new mills are in course of construction. A recent report of the business done by the Settsu Spinning Company, of Osaka, shows the estimated net profits for the past 6 mos. to have been enormous, out of which a dividend of 20 per cent will be paid the stockholders. A recent newspaper article bearing upon this subject says;-"The continued prosperity of the yarn market has greatly improved the financial position of the Kibi Spinning Company, of Okayama, which has been in difficulties for some-

borrowed \$113,000 from the Yamagushi and Konoike banks, of Osaka. With this handicap the company's prospects were not very bright but the wave of prosperity for the spinning companies that has been experienced in the past year or two has enabled the company to repay \$5,000 gold monthly to its creditors since June last. From February this was increased to \$10,000 monthly, which will clear off the debt by August next. The company owed a large sum to certain foreign firms, which was compromised by being reduced two-thirds in amount, and the last installment of this reduced the debt and it has now been paid."

The most marked feature of the year 1905 in the industrial life of Japan is the vast number and amount of new loans that are being placed abroad. The government is redeeming its 6 per cent bonds, for which it received from 86% to 90, with 4 per cent bonds for which they receive 88. This is the measure of the improvement in the national credit of Japan since peace was declared. The improvement in industrial credit is equally marked, and many 9 per cent loans are now being redeemed with 6 per cent loans, and large amounts of new loans are added to promote other industries. Several large loans have lately been negotiated for opening and extending mines, making improvements and extensions, and construction of new lines of railways. These loans have been mostly on 20 yrs.' time at 4½ per cent interest and issuing price of 92. Many other industrial loans are being made at about 6 per cent for a great variety of manufacturing and industrial enterprises. This great reduction in the rate of interest from 9 per cent to 6 per cent and less is certain to lift the heavy load from many enterprises and give them a new impetus. The result of these great foreign loans at this much reduced rate of interest to banks, railways, and all forms of industries and commerce will be to provide much lower rates for many. The present bank rate of about 8½ per cent will either be lowered, which in itself will encourage business of every form, or the expansion will be so great in trade and commerce that this increased capital will be put into enterprises that will sustain this high rate. In either case a large increase in various forms of industry and business seems to be at hand for Japan. The vast amount of cheap labor and splendid industrial skill in the country, combined with this reduction in interest on berrowed capital, together with the broad field of exploitation and markets now assured to Japan throughout Korea, Manchuria and China, makes an excellent foundation for commercial and industrial expansion, upon which Japan will proceed to build her new national structure.

In manufacturing development Japan is making progress in production of iron, steel, electric ight appliances, wire, rails and cars, cotton goods, and in a great variety and diversity of lines. Linen is brought from Ireland and made into collars, cuffs, drawn and embroidered work, and then sent to Europe and the United States. The surprises in Japan's manufacturing development will come as much in diversity as in the general volume of business. Especially will it be marked in all lines that require delicate and artistic handiwork.

The Osaka Alkali Company is floating a foreign loan of \$250,000 gold through Samuel & Co., one-half of the sum to take up the existing debentures, the other half to establish a new fertilizer factory. Messrs, Samuel & Co. will become sole agents in Hongkong and southward for the sale of the sulphuric acid produced by the alkali company. The government iron foundry at Edamitsu, near Moji, has been so much enlarged and improved that the authorities optimistically believe the foundry is in a position to supply all home demands, and rails at least need not again be imported from abroad. The foundry is about to begin manufacturing telegraph wire and railway carriage iron. Its present output is 70,000 tons per annum.



EQUIPMENT FOR PONIES IN THE FIELD WITH THE RAILROAD LOCATING PARTIES, MANUFACTURED BY MESSRS. PICKETT & ROBERTS, MANILA

ENGINEERS BEGIN THE SURVEY OF RAILROAD ROUTES IN PANAY, CEBU AND NEGROS, P. I.

(Continued from page 1.)

than that which will be encountered in Panay: Negros and Cebu. Others have had much valuable experience with railway construction in the Tropics of Central and South America, so that altogether the personnel of the party augurs much for the efficient consummation of the work in hand. Mr. Beard's principal assistants are Mr. L. E. Bennett, right-of-way agent; Mr. J. M. Robinson, late locating engineer of the Guayaquil and Quito Railway; Mr. H. F. Howe, late acting chief engineer of the Canton and Hankow Railway; Mr. C. H. Farnham, M. Am. Soc. C. E, late division engineer and superintendent of construction of the San Shui Division of the Canton and Hankow Railway; Mr. C. J. Hogue, M. Am. Soc. C. E., late engineer-in charge of maintenance and way of the Choctaw District of the Rock Island System; and Mr. F. D. Nash, late engineer-in-charge of 50 ms. of reconstruction of the Chicago, Burlington and Quincy Railroad in Iowa. Mr. Bennett has spent many years in the Orient and in these Islands.

The principal stockholders of the Philippine Railway Company are Messrs. J. G. White & Co., Mr. Cornelius Vanderbilt, Wm. Salmon & Co., and Heidelback, Ickleheimer & Co., bankers of New York, and Mr. C. M. Swift of Detroit. Mr. Swift was one of the promoters of the Manila Electric Railroad and Light Company.

ORGANIZATION OF LOCATING PARTIES,— Chief Engineer Beard has organized five locat-

ing parties, three of which will operate in Panay under the supervision of Mr. J. M. Robinson. Another party will operate in Negros under Mr. C. H. Farnham; and another in Cebu under Mr. H. F. Howe. Each party consists of 20 men, of which only eight are whites, and these will conduct the engineering work. All supplies for field work, such as instruments, tents, cots, filters, etc., were packed and shipped out from New York in such a manner that they could be transferred to the field in their original packages without the necessity of being repacked here. The equipment for the pack trains and saddle horses was made in Manila by Messrs. Pickett & Roberts, manufacturers of harness and saddles, and is the best that first-class workmanship and materials can produce. Native ponies will be used exclusively in the locating work, and as the surveys and construction progress tents will give place to permanent bungalows for the engineering parties and construction gangs, their location depending entirely upon the demands of construction. The field parties will be expected to live off the country almost entirely, so that the natives there will find a ready market for their produce.

Medical Service and Sanitation.—The chief engineer intends to establish a competent medical and hospital staff, which will be under the direct supervision of a chief surgeon whose selection is yet to be made. As the principal plant and supply depot for construction will be at Iloilo, a general hospital and the office of the chief surgeon will also be lecated there. It will be the duty

of the chief surgeon, besides instituting a modern system of sanitation at all the camps, and instructing the members of the parties in tropical sanitation, to look after the general health of all employees. Each camp will be provided with necessary medicines and surgical supplies for emergency treatment, and as far as possible local doctors will be enlisted to attend these camps professionally at stated times and thus assist the chief surgeon in his duties. Mr. Beard says that the health of the engineers will be his first consideration, and to insure efficiency the medical branch of the construction will be organized along the lines of the army medical department and hospital corps.

Construction to BE Carried on Rotatively.—The construction of the railroads will be accomplished rotatively, beginning in Panay. It is hoped to have all the survey work finished in time to begin construction at the commencement of the next dry season. Immediately after the locating parties on Panay complete the surveys of that island, they will be transferred to Negros and Cebu to assist in completing the work there. All supplies and materials brought from the United States will be shipped direct to Iloilo, and shipped from there according to the demands of construction.

UNIQUE FEATURES OF THE CORPS.—Fifty per cent of the engineer corps under Mr. Beard is made up of college graduates, and the party is the largest of its kind that has ever left the United States on a similar construction expedition. The chief engineer caused

(Continued on page 7.)

CONSTRUCTION OF THE SHANGHAI TRAMWAY SYSTEM UNDER WAY

The construction of the Shanghai Tramways system is now under way. Ground was first broken by what is called the 4-mile post on the Yangtszepoo-rd., with considerable ceremony, and since then the contractors, Messrs. Bruce, Peebles & Co., Ltd., and the Shanghai Electric Construction Company, Ltd., have put large construction forces on the works.

When completed the system will consist of 23 ms. of track, including double track, and the gauge will be of 1 meter, or 39.3705 ins. The double line will commence at Bubbling Well-rd, at the intersection near the Chinese Garden, and will extend down Avenuerd., Carter-rd. and Bubbling Well-rd. at the Bund, with the exception of the small piece of line between Kiangse-rd, and The Bund. According to the North China Daily News it has not yet been definitely decided whether the latter piece of line shall be single or double, but there is much to be said in favor of a double line in this narrow, crowded thoroughfare. The line along The Bund from the Yangkingpang and to the Astor House, at least, will be double with a single line down

footways, roads or gutters, in troughs filled up with bitumen. It was pointed out at the last ratepayers' meeting that the Municipal council will need additional machinery at its works to generate the additional quantity of power required, and it is understood that steps are now being taken to meet this necessity.

RAIL LAYING AND STREET PAVING.—The rails will be laid on 6 ins. of concrete, and along The Bund and the narrow part of Nanking-rd., wood paving will be laid between and 18 ins. each side. The rails weigh 95 lbs. per yard and they are of British standard design with a slot rather less than I in, in width. It's contemplated that as soon as the laborers grow accustomed to the work of construction the contractors will be able to lay down ½ m. of permanent way a week.

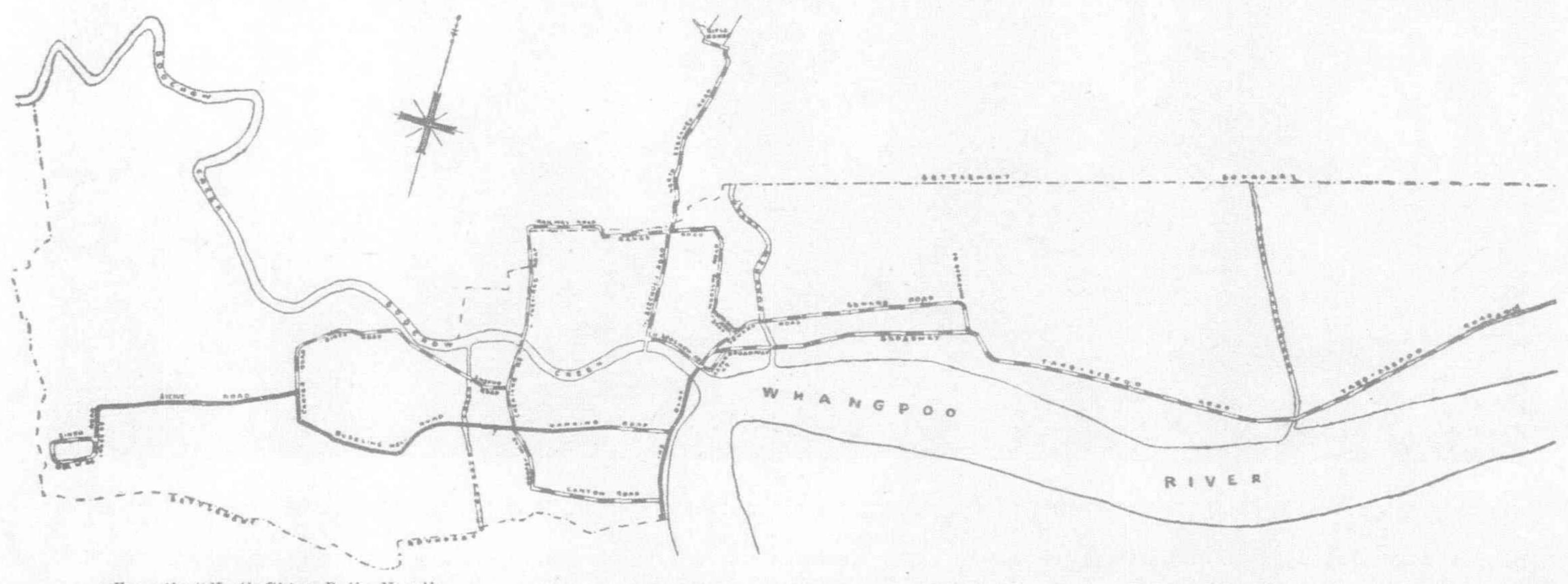
RAILWAY CONSTRUCTION IN BURMA

(Written for the "Straits Times" by Phila Penn.)

The Indian Railway Board, one of the last creations of the Curzon administration, has just completed its first year's labors by a

political heat waves have expanded official minds, the eastern boundaries of Further India have received some little consideration. But the general laisser faire policy of the British foreign office, and its failure to hitherto recognize the political and commercial importance of conquest by railway, have been vital factors in rendering that attention abortive and materially retarding those imperial interests to advance which is one of the fundamental principles of their constitution. The effect of this has been seen in the almost criminal neglect in affording the means necessary for the opening up of foundaries to foreign trade, and where practicable to give support to native commercial enterprises -in the seemingly lasting determination to clog industrial progress and cripple trade expansion.

Pacification of the Frontier.—Notably is this so in the case of Upper Burma which has just attained its majority under British rule. Of course in the earlier years of its acquisition much had to be done in clearing the country of the hordes of dacoits who came over the border, but for the past 6 yrs. or so there has been a gradual settling down to law and order, and crime on the highways has been reduced almost to a minimum. In the Southern Shan States, on the Chindwin Hills, and away on the extreme E,



From the "North China Daily News"

PLAN SHOWING THE ROUTES THAT WILL BE TAKEN BY THE SHANGHAI TRAMWAYS; FIRM BLACK LINE REPRESENTS DOUBLE TRACK AND BROKEN LINE SINGLE TRACK

Broadway and another single line up Seward-rd., from Muirhead-rd., turnouts on both being arranged so that in the event of the roadway being taken up for repairs the cars in the other street will be able to run in both directions. From the Astor House a single line will run to the North Scechuen-rd, and a single track with switches will be constructed up the North Szechuen-rd, and the Extension to the Rifle Range terminus.

CAR SHEDS AND TROLLEY SYSTEM.—The car sheds will be erected at Bubbling Well near the cemetery, and accommodation will be provided for over 60 cars—in fact 63 have already been ordered. The cars will be convertible so that in the summer the sides will be open and the seats fixed across, while in the cold or wet weather the sides will be closed and the seats longitudinal. Each car will provide seating accommodation for eight first-class and 22 second-class passengers. The first and second-class compartments will be quite separate.

The tramway is to be constructed on the overhead trolley system, and the power will be supplied to the company by the Municipal Council from the electric light works in Fearon-rd. The power will be distributed from the works by cables laid under the

tour of inspection over the Burma tracks. The board was constructed simultaneously with the new Department of Commerce and Industry, and two out of three of the members won their spurs on the Indian lines. Mr Upcott, the president, had for many years the supervision of railway traffic in Northern India, and Mr. Wynne, his colleague over the Bengal Nagpur, Northwestern, and Great Indian Peninsula systems, has acquired an extensive knowledge of local circumstances, which make him well fitted to advise on matters of detail connected with railway construction and management. These aids, supplemented by the wide experience of the third member on British, continental, and American tracks, should make the new bureau a tower of strength in the deliberations of the Simla Council when railway matters come up for consideration.

An Imperial Issue.—The tour of the board, extending from the extreme W. railhead to the farthest N. limit on the E., is one of imperial import, and, if the results are not pigeonholed in the Simla archives there to rest till the next official convulsion rouses them to activity, considerable stimulus will be given to British imperial interests both in the E. and Far East. The NW. frontier of India has of late years had increasing attention, and every once in a while when

border, lawlessness in its violent forms is almost of the past, and trade goes on as secure as that in Lower Burma which has lived the proverbial allotted span of years under British administration. To accomplish this pacification has been a colossal task, and many of the pioneers, now beyond this mortal ken, pass in review in grateful remembrance as the visitor travels in absolute security on railroad or river.

Primitive Transport .- To, however, sufficiently realize the difficulties labor and capital have to contend with for want of communications in Burma, one has only to travel to her inland centres of industry, access to which is only gained by the most primitive modes of transport. The oil wells at Yenanyoung are far from the iron track, and to reach the Ruby mines conveyance by a far from polished road is necessary. The headquarters of three commissionerships, viz., Moulmein, Akyab, and Minbu, have no railroad communication at all with Rangoon, while the vast area of Arakan is neither connected with Burma by rail nor river, not even by a metalled road, and Sandoway is entirely cut off from sea communication during the south west monsoon. There is no rail track to the Southern Shan States, and they can only be reached by a very inferior hillroad. Even in the S. which has had its

present railway connections with the commercial capital for nearly 4 yrs., the roads are very inferior, and cultivators experience much difficulty and hardship in conveying their produce to market, or to the banks of the Irrawaddy for shipment in the flotilla steamers.

Rude Awakening.—This apathy to meet the growing needs of the province has long been a source of wonder to those who are concerned in eastern industrial and commercial reex-pansion, especially when every financial turn records increased revenue. Unhappily, the relations existing between the local government and that at Simla have been rather strained of late, and something approaching a deadlock in the through passage of administrative details has resulted. Under the new viceregal régime, however, much has been done by the suaviter in modo; much more by the fortiter in re, and all things working smoothly we may hope to see the country in the near future fully opened up to trade with the lines of communications to the various centres completed and in full working swing.

Line to the Frontier .- It is, however, with the extension of the Burma system to the China frontier and beyond that the chief public interest in the report of the railway board will be centered, and the liveliest satisfaction will be evinced if the work which has been undertaken to lay the rails between Bhamo and Momein is hurried on to completion without any administrative hitch. Momein, or Teng-yueh, as it is more particularly known in the Chinese vernacular, is about 120 ms. to the NE. of Bhamo as the crow flies, and is on the Burma trade route to Yunnan-fu, the capital of the Province. It is a town fast growing in importance as one of the principal trade centers of Eastern China. The fact that a customs station under European supervision has been established there for some years shows the importance which the Chinese officials have attached to it as a trade center, and now a British consul has been placed there to protect the traders who are at present dealing with the Burmans and Shans, and who do a large import and export business with Upper Burma. From Momein the road to Yunnan-fu presents very few engineering difficulties, and the country onwards to Suifu, the highest navigable point of the Yangtze for small craft, would be almost plain sailing. It has always been the idea of successive governments to connect Upper Burma with the British sphere of influence in the Vangtsze Valley, and a few years ago the Lashio-Kunlon extension was commenced with that end in view. Shortly before the Boxer outbreak a flying survey was made and a route to Yunnan-fu was projected. Another survey was made up the Nam Sing River from Kunlon, and a track was found which would tap three provinces, Yunnan, Szechuan and Kwangsi, and which would only necessitate the crossing of one range of mountains-the range dividing the Salween and the Mekong, and, up the river draining the Talifu Lake, tapped a lengthened area free from mountainous ranges westward of Tali-fu some 30 to 35 days journey from Bhamo. To the E. of Tali-fu it passed a plateau, estimated to be about 6,500' above sea level on which were small picturesque mountains and valleys extending to Yunnanfu. Before the diplomatic change, which placed Sir Ernest Satow in Peking, representations were made to the Chinese Government on the subject of running a line through Yunnan to the Yangtsze, but Sheng Ta-jen, the late Director-General of Chinese Railways, was averse to the scheme and it fell through. Since then nothing has been done, and there still remains that great obstacle to railway development and trade with Eastern China -the apparently hopeless conservatism of our own Far Eastern policy—the policy of drift.

Trade with Yunnan.—It is impossible to over estimate the commercial advantages which would accrue, if Burma was fully opened up by rail with Yunnan. Already the volume of trade with the Yunnanese is

by no means confined to a few petty traders. A large import and export business is carried on, the continuance of which must depend on the absence of competition by the Red River route to Indo-China or to the SE. by means of the Canton River. In the Yunnanese valleys two crops of rice are grown every year, and beans, sugar-cane, peas, etc., thrive in abundance in well-irrigated soil. The province is a veritable fruit garden, some of the products being up to the standard of those grown in California. Pears, much resembling those reared in Tientsin, and apples with almost as rich a flavor as the Devonshire product, are grown in orchards stocked with peaches, plums, apricots and strawberry beds. In the forests chestnuts and walnuts are plentiful, and on the plains vegetable gardens yield a capital return for the assiduous attention paid to them by the cultivator freed from the terrors of landlordism which retards somewhat the enterprise of his Burmese neighbor over the border. Cattle breeding on the hillsides finds lucrative employment for a large number of Yunnan shepherds, and over extensive areas mules are bred in their thousands, and are largely used in the transport of produce to the western outlets.

Yunnan's Mineral Resources.—The only serious obstacle to the rapid development of the mineral resources of Yunnan lies in the cupidity and corruption of the native official. The province is stated by prospectors, whose words may be readily accepted, to be rich in gold, silver, lead, iron, copper and tin, and although the Yunnanese have worked with the most primitive means at their disposal, their labors have been profitable. To the E. of Yunnan-fu are some coal mines, the mineral comparing very favorably with the Shansi product or the Miike mines of Japan. Salt is somewhat plentiful in Yunnan and there are indications of oil wells being in many of the valleys. Enough has been said to show how great is the value to be placed upon the opening up of Burma to Yunnan trade and how much will be lost if there is any further hesitation, delay, and nervousness while other influences are steadily plodding towards the much desired end.

Connection with Moulmein .- As far back as the early '80s, and long before the acquisition of Upper Burma, the proposal to connect Moulmein with Rangoon came on the tapis. The Bombay Burma Trading Corporation-a body of capitalists who were responsible for King Theebaw's overthrow-saw in the project much that was in harmony with their ideas of monopolising all that was valuable in the exportation of teak, principally to Europe, where at that time the logs were fetching an abnormally high price. The directors were practically pseudomembers of the administration, and the influence they wrought made itself felt irrespective of the needs of the hour. A report on "the absolute necessity of additional means of communication with Rangoon" was drawn up, and submitted to the Government of India, but it was ultimately vetoed by the imperial government on the ground of inexpediency. Subsequent to this from time to time the "need" has been emphasized, and just before Sir Hugh Barnes left the province he referred to the subject with much warmth and "how much remained to be done to develop its (Burma's) latent resources. It was difficult to realize. Sir Hugh said, that after 70 yrs. of occupation the only way to reach Moulmein was by steamer from Rangoon, and Akyab was in a position that she could only be reached once a week by sea. How far the railway board will share Sir Hugh's dismay remains to be seen. Certain it is that starting the construction of the line to Moulmein is one indication of future effort-effort which must redound to the best interests of the province and the empire in the Far East.

Financial Aspect.—The continued retention of public funds, and the refusal of the central government to carry out works which have hitherto demanded their most urgent and serious attention are matters of history,

but they may be well considered, viewing the financial aspect, and seeing how far the burden would have to be borne by either the central or imperial government. Since the acquisition of Upper Burma, the province has increased in population by nearly 200 per cent. Her contribution to India during 1903-4 was Rs. 3.6 per head of her population, and during the following 12 mos. her revenue had so increased that it reached Rs. 4 per head twice as much as that contributed by the aggregate population of the provinces of Bombay, Madras, Punjab, and the United Provinces. And yet, withal the Government of India have seen fit to take up an uncompromisingly exacting attitude on matters of public utility, and are systematically plundering with murderous intent the highlyfattened goose which has been laying her golden eggs. Further more the penny-wise and pound-foolish policy of three governments has resulted in a considerable diminution of the teak trade, and Burma is fast losing its position as the main source of the teak supply of the world. Much of this is due to the areas now being less accessible, and the government monopoly which drives price up to the extreme limit. In short, Burma, while contributing more than she can afford, consistently with her own development, is denied even a share of that assistance which appears to be so lavishly showered on other portions of the British realm.

FIRE FIGHTING APPARATUS IN CHINA

The construction of native houses in Shanghai, as well as in nearly all other large Chinese cities, being principally wooden, renders the danger of destructive fires great, and, as a consequence, through the desire of the people themselves and by reason of the demands of the insurance companies, there has been quite a large sale of fire extinguishers of many kinds. Nearly every foreign and many native importing houses handle these extinguishers and several agents are constantly at work. The losses from fires in Shanghai are heavy, and yet, under the careless methods of the Chinese as to protection from fire, it is remarkable that the amount is not much greater. No accurate statistics in regard to this fire loss are obtainable. It is to be believed that the Chinese will welcome improved fire-fighting apparatus, although one gains the impression by viewing their daily life and observing their habits as to fire-producing agencies that they are indifferent to the results. The only fire protection of the international settlement at the present time is the volunteer fire brigade, the municipal waterworks, and the various patent extinguishers.

THE FAURA BAROMETER

Last month THE FAR EASTERN REVIEW mentioned that La Esmeralda, "of Paris and Manila," was the exclusive manufacturer of this famous maritime instrument. There was a slight inaccuracy in the designation of the places of business of the firm in that the head house of La Esmeralda is located in Manila, and not in Paris. Orders for the barometer should be given to the Manila house.

ENGINEERS BEGIN THE SURVEY OF RAIL-ROAD ROUTES IN PANAY, CEBU AND NEGROS, P. I.

(Concluded from page 5.)

the members to rendezvous at Kansas City from all sections of the United States, and from there the party went across the continent to the port of embarkation. Mr. Beard's head-quarters will be in the De La Rama building at the foot of the Santa Cruz Bridge, Plaza de Goiti, Manila, where he and his staff will occupy the suite of offices recently vacated by Messrs. J. G. White & Co.

PRELIMINARY RECONNOISSANCE OF THE MANCAYAN-SUYOC MINERAL REGION,

LEPANTO, LUZON, P. I.-II

(By ARTHUR J. EVELAND, M. E., Government Geologist)



MANCAYAN RIVER VALLEY

CHAPTER IV.

Topography.—Northern Luzon, above the 16th parallel of N. latitude, presents fairly uniformly a single topographic type. It is characterized by parallel approximately N.-S. mountain ranges, with extensive longitudinal valley systems. Broadly speaking, almost in the center of the island is the main chain, the Cordillera Central, and its extensions, the Cordillera del Norte and the Caraballo Sur, which forms the main watershed of Luzon. Two coast ranges, the Sierra Madre of the Pacific Coast, and a series of somewhat irreg-

ular ranges on the W. coast, under a variety of names, mark, with the main mass shown the roughly parallel system of mountain range and valley. From the central cordillera transversal valleys modify the regularity of the structure, and present, in central Northern Luzon, a broken and irregular appearance, the region immediately to the E. of the Cordillera Central being particularly irregular.

Denudation is the keynote of the topography, and although the immediate E. and W. boundaries of the area more closely connected with the territory under mining investigation

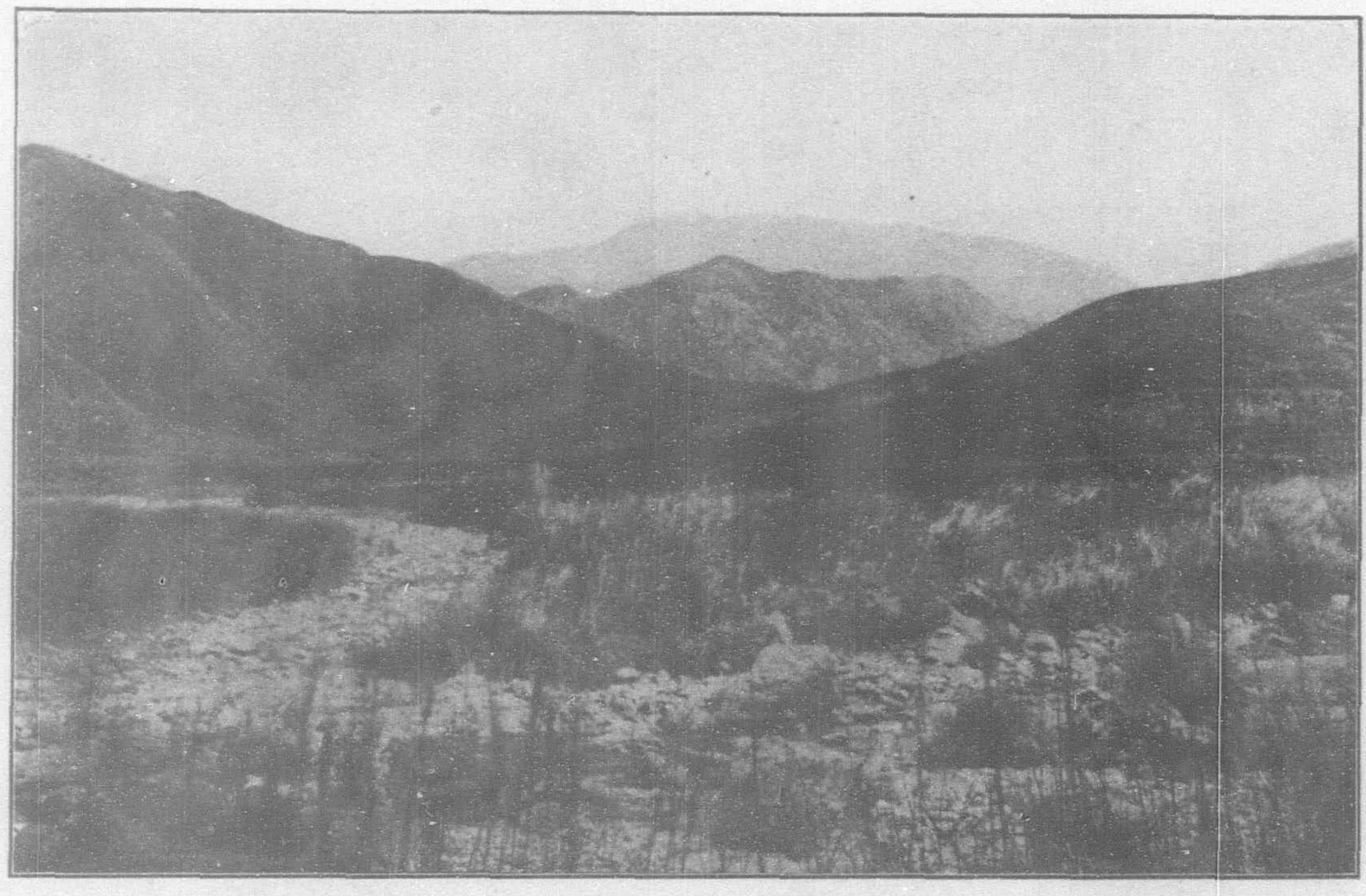
depend to a greater or less extent on the structure, the limiting ranges on the sides being tectonic in type, late volcanic action and extreme degradation have combined to produce topographic forms unclassifiable under one head.

The regions of Mancayan and Suyoc are at the head of the Abra Valley, which has resulted from the breaking down of an anticlinal arch of wide extent, and possibly, to some degree, to faulting of the same.

On the W. of this valley lie the Cordillera del Teila, an escarpment of westwardtilted sedimentaries rising some 4,000' above



SOUTH FROM MANCAYAN, SHOWING MANGAMBANG RIVER GORGE



MANCAYAN RIVER AT BUGIAS

the level of the sea, and here on the E., having a precipitous slope to the valley of the Abra (at Angaqui), at the foot of Teila Pass, of 3,000'.

On the E. the main watershed of the Cordillera Central marks the boundary of the province, and similarly this range is flanked on the E. by tilted sedimentaries. The valley is terminated at the S. by spurs in a NE. direction, which also mark the boundary of Lepanto Province.

The topography of the immediate area of the mineral exploitation is therefore of a limited area only—that of the head waters of the Abra River. Situated as this district is, on the flank of Mount Datá of the Cordillera Central, and closely surrounded by the limiting ranges, the topographic forms are dependent to greater measure upon drainage and subsequent degradation than upon structure. The sedimentaries to the W. are some little distance from this region, and

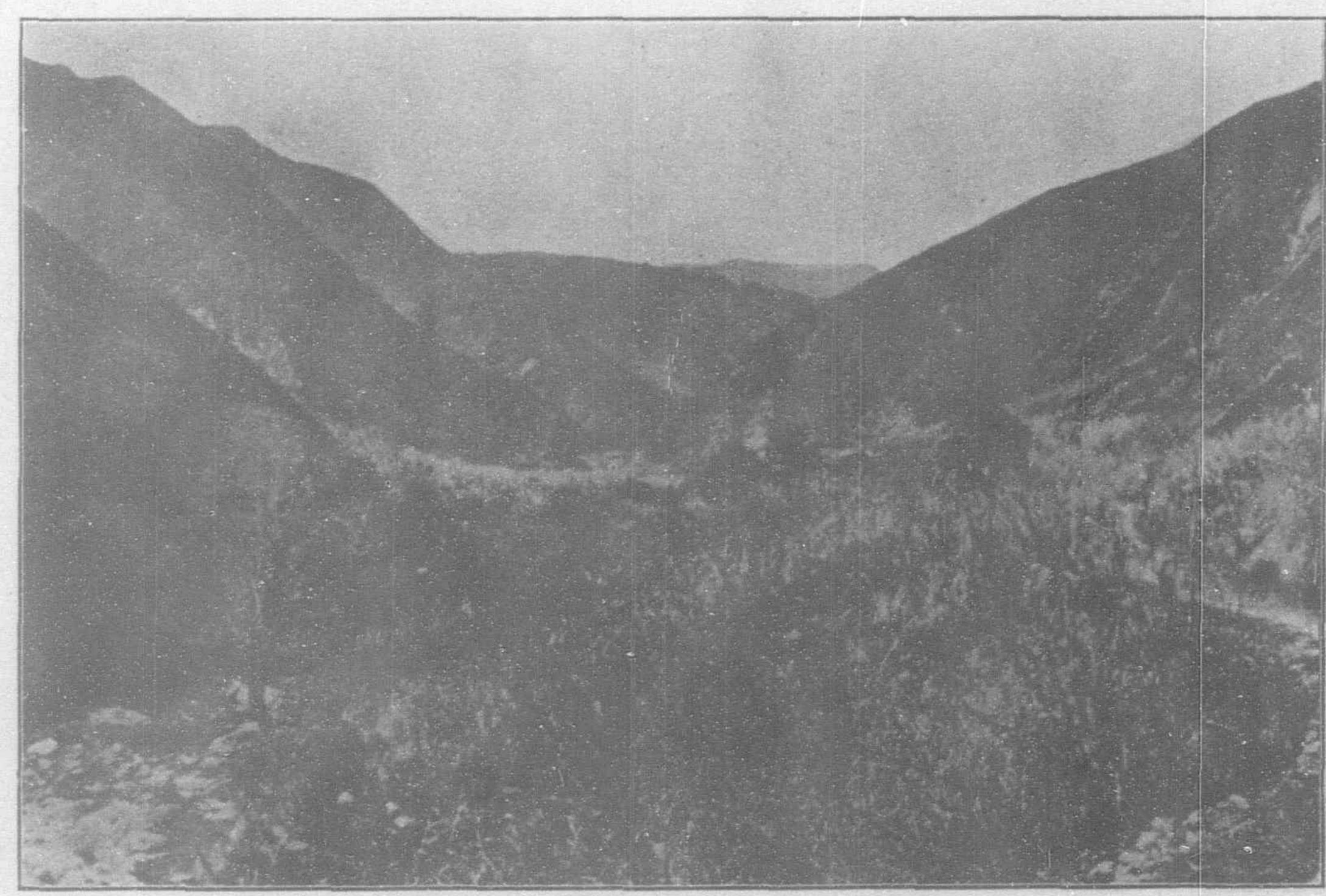
those to the E., though uncovered by river action only at the immediate eastern side of the mineral district, have been buried by late volcanic material to a considerable depth. Drainage from this region is directed altogether to the N., ultimately, and the generally northern trend of the valleys in connection with the usual radial type of mountain mass erosion produces the resultant deeply eroded surface.

The small area over which mining and prospecting are being carried on rests on the W. slope of Mount Datá, and a spur which extends from that mass to the W. As a whole, the slope of Datá to the western side is uniform, forming an irregular conical mass, around the base of which runs the Abra River and its tributaries. On account of rainfall conditions the erosion has been marked, and steep gorges, V-shaped, are the rule. The upper volcanic rocks of the eastern portion of the region are of a yielding nature, and erosion

produces rounded forms, hog backs, and mounds, giving a quite regular slope to the immediate base of Datá; further to the W., where the rock masses are harder, and in the intermediate areas, where the streams cut through into the hard material beneath, the steep-sloped ravines predominate, and the drainage is divided so carefully that ridges and spurs give at the top but space for a foot trail. Lateral erosion has been deep and rapid, and a general topographic map of a large area will show a well-dissected region.

The towns of Mancayan and Suyoc are situated on the top of the less resistant material spoken of and the appearance of the area around them, rounded and rolling, is in decided contrast to the steep slopes and rapid fall of the gorges and river channels at their immediate boundaries.

HYDROGRAPHY.—The region of Mancayan, situated, as it is, on the slopes of Mount Data,

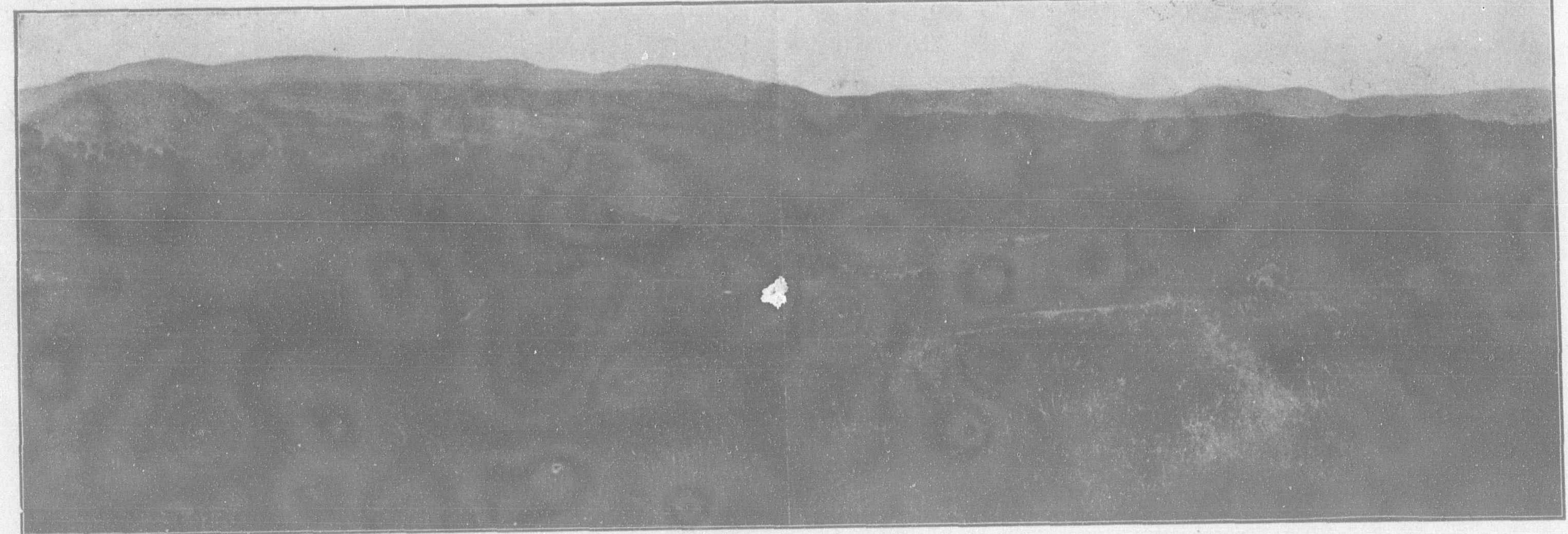


MANCAYAN RIVER VALLEY ABOVE BUGIAS





SUYOC AND THE UPPER VALLEY OF THE ABRA



TOPOGRAPHY EAST OF SUYOC



COPPER MINES, MANCAYAN

is well drained by numerous streams, chief among them being the Abra and its tributaries. The course of the Abra proper is somewhat peculiar. It rises a little S. of Mancayan, flowing in a southern direction, for a short distance, describing a semicircular course, through well-cut, V-shaped gorges to Comillas, NW. of Mancayan. From there on the course of the river is normal, winding through the broad valley between the Cordilleras de Teila and Solis.

Starting from Tuboc, the barrio nearly in the center of the district, the Mancayan River cuts an almost straight path to its junction with the Abra at Comillas. At a short distance from its origin it is entered on the E. by the shorter stream known as the Mangambang, or Tabio, which rises on the Aban spur of Mount Data, and cuts the gorge of some 500' through the deposits of copper at Mancayan.

Farther to the E., on the upper slopes of Mount Data, the river early develops power, and, flowing westward for I or 2 ms., turns abruptly to the N. at a right angle, and finally debouches into the Mancayan at Baguis, 3 ms. above (S. of) Comillas.

The River Maanse has its origin south of the Mangambang, or Tabio, on the same spur (Mount Aban), flows W. to Tuboc, thence S. to Cayan, where it is met by the gullies draining the northern side of Suyoc Hill; and then in a westerly direction pursues a winding course through steep, V-shaped gorges to the Abra, several miles SW. of Suyoc.

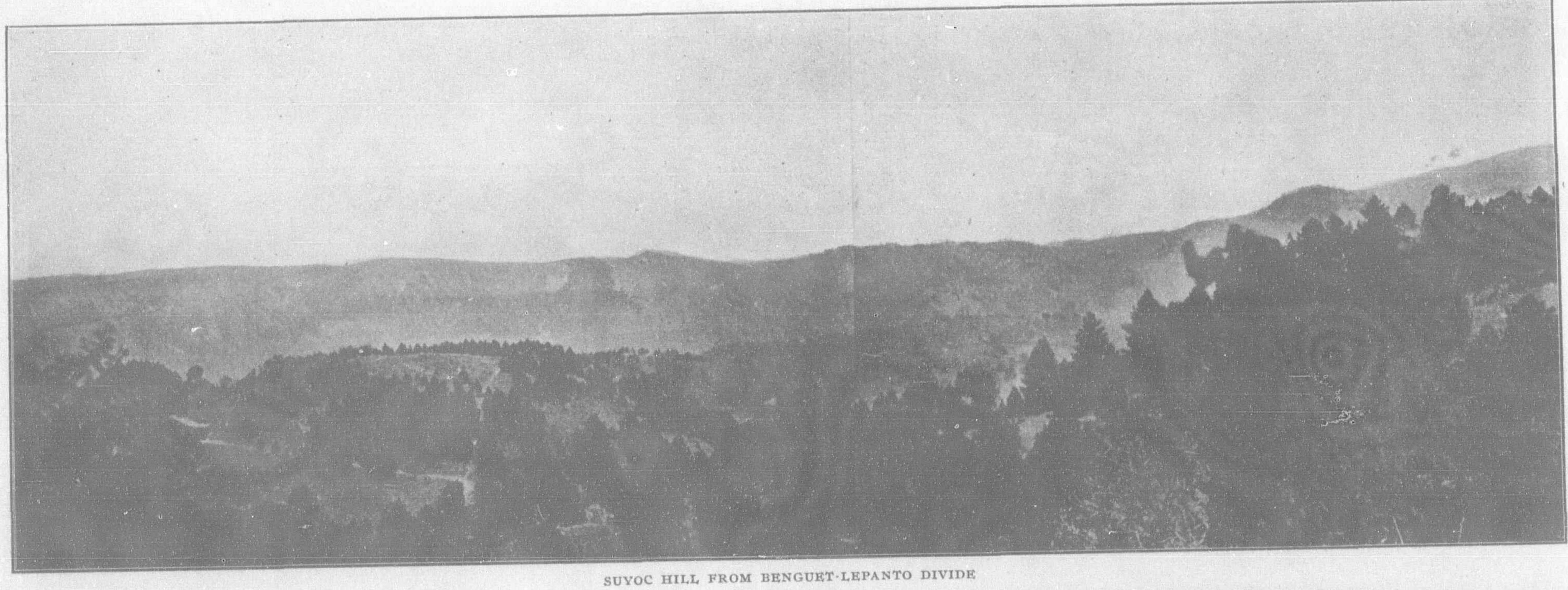
The topography and geology of the region have affected the drainage to a considerable extent, as will be spoken of later. The rivers N. of Mancayan present the usual condition of mountain-river type—the torrential water

course, heavy falls, a swift, deep-gorge-cutting stream debouching into the broad valley below. But S. of Mancayan irregularities of drainage are met with that indicate certain orographic changes and influences due to the nature of the rock masses.

All the rivers of the region could be described as in first and second stages of levelopment, with steep declivities. They are to considerable extent dependent upon the seasonal changes for their volume and show large variation between extremes. During the dry season, only the springs and the old water keep up the volume. There is a very great diminishment in volume and power, though the streams do not by any means run dry. From the beginning of the rainy season the river steadily increases in size, and becomes, after the occasional, long, steady torrents of rain, tremendous confined floods. Until the water

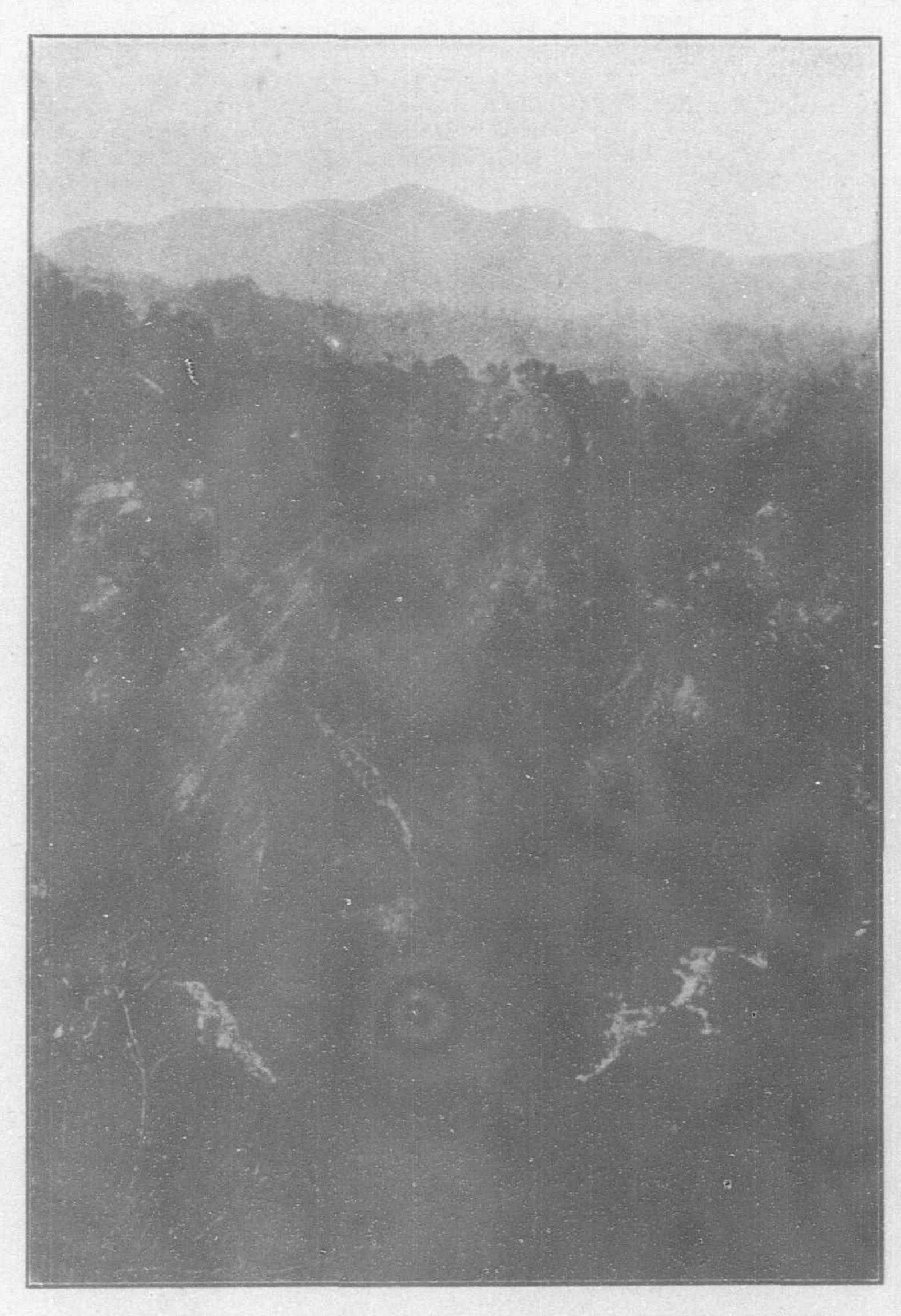


TOPOGRAPHY ON MAANSE RIVER

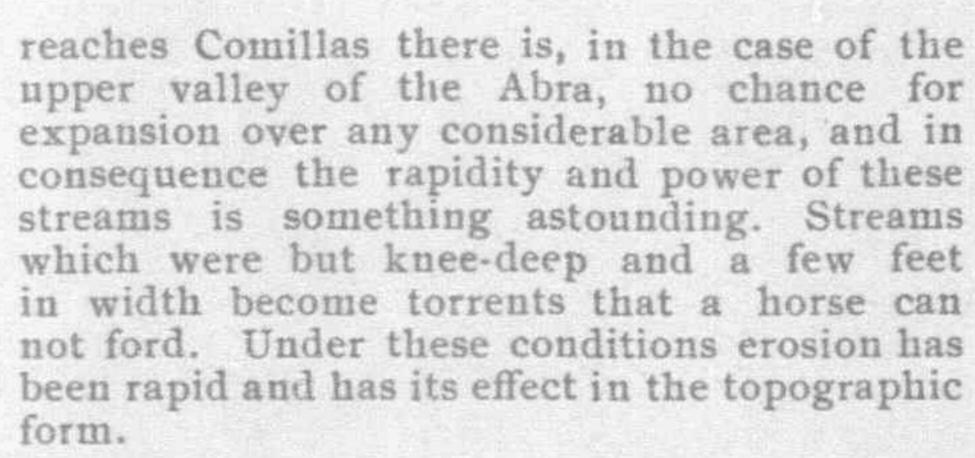




IGOROT WORKINGS AT SUYOC



MANCAYAN RIVER GORGE, WEST OF MANCAYAN; MOUNT MALAYA
IN BACKGROUND



The Ahra River waters above Suyoc and those of the Bat-Bat River to the E. are hardly potable from the viewpoint of the European while the streams heading up in the mineral region, as the Maanse, Pacat, Mancayan, are extremely bad. A great amount of copper and iron salts is present, as well as arsenical soluble salts, and certain springs are quite poisonous. At the meeting of the Mancayan River, which is very clear, and the Mangambang River, slightly milky and brownish, there is deposited a vivid blue film or coating in the bed, which diminishes in intensity for fully 2,000' downstream, and the vivid blue color of the water and of the bluecoated bed produced by the chemical reaction is plainly discernible from the tops of the surrounding ridges. The explanation of this unusually strong reaction lies in the fact that the Mangambang River, as heretofore stated, cuts directly through the deposit of the copper minerals, of the old mines, and the Upper Mancayan River drains an area more or less shattered and decomposed, with a great deal of altering iron sulphides.

The occurrence is so striking that in previous times it certainly should have been and probably was an index finger to the prospector.



OLD SPANISH ROAD TO COPPER MINES, MANCAYAN, SHOWING CONTACT BETWEEN OVER LYING QUARTZ-PORPHYRY AND MANCAYAN DIORITE

There are, however, many springs among the extraordinary number with which the district is watered, a number of which give cool, clear, and pure (no analysis made) water. These waters are fairly potable.

Hot springs, while not flowing in the immediate area under consideration, are prevalent all through this mountain region. In the Province of Benguet, some 40 ms. to the SW., there are numerous active springs, which are sufficiently large in volume and temperature to be worthy of considerable attention. And in Lepanto Province, to the N. of Mancayan, there exists a similar region. The nearest of these occurrences is at Comillas, less than 10 ms. NW. of Mancayan on the trail to Cervantes, where the trail crosses the River Abra. Here there is a small hot spring which has been described by Centeno, under the Spanish régime, as a ferruginous sodium-chloride spring.

At Cervantes, in the flood plain of the River Abra, by which it is covered at periods of high water, are several springs, or, in all probability, several vents of the same spring, within a comparatively few feet of one another.

On these springs, as well as many others of the Islands, the Spanish Government made more or less extensive reports, and the following excerpts are chosen from the reports mentioned, as of some value. Of the Comillas springs, Centeno says:—

"It gushes out of an ancient wash of angular dioritic and other eruptive rocks, forming a small pool at the river, in which, notwith-

standing the high temperature, which the human body hardly can bear, the Igorots are accustomed to bathe, with good results in the great variety of cutaneous diseases to which they are subject. From this comes the great faith in their waters, that these poor people have. Guided as they are by superstition in almost every act of their lives, they never bathe here without invoking the favor of the anitos of the spring, making a modest offering, which generally consists of a little palay or rice, which they throw into the pool."

Centeno gives the height of this spring as 460 meters (1,518') above sea level; from the recent survey it is approximately 1,400'. A flow of 1.43 liters per second was recorded, or 123 cubic meters in 24 hrs. The water is clear, transparent, inodorous, and tastes salty; neutral reaction on litmus; no gaseous emanations; temperature of the water, 50° C. (the air, 26° C., December 17, 1886); density at 0° C. and 760 millimeters is 1.004375.

Analysis of I liter of the water is as follows:—

Content.	Weight
CO Ca.O (precipitated by boiling) Mg.O (precipitated by boiling) FeO (ferroso) (precipitated by boiling) SiO FeO (in the decanted liquid) CaO (in the decanted liquid) Na.O LiO So Cl.	Gram. 0.060000 .006720 .006882 .Trace .074400 .180000 .086016 .268349 Trace132582 .316652

Residue obtained by the direct evaporation of I liter of water and dried at 180° C. (approximately) weighed 0.851000 gram. It is calculated from the analysis that I liter of water at 50° C. contains in solution:—

Content.	Weight.
Cubic centimeters, O	Gram. 0.005669 .009961 .034669 .017280 .021658 Trace208896 .018339 .506678 Trace016427 .074400
Total	.918972

The Cervantes spring issues from the margin of the river, at a height (Centeno) of 435 meters above sea level, at a rate of 0.24 liter per second.

The water is clear, transparent, uncolored, inodorous, with a slightly salty, hard taste. It gives out bubbles of gas, and the litmus paper shows a neutral reaction. The temperature of the water is 56° C. (air, 25° C.) and density at 0° C. and 760 millimeters is 1.004732.

Anhydrous substances in I liter of the water are as below:-

Content.	Weight. Gram.
Co	0.00400C .032: 00
SiO	.237440
MgO Na ₂ O	.426687
So ₃ ,	.\$21888 .3 \$5 456

A1 ₂ O ₃		223
Caco,	tter	Trace.

Residue obtained by evaporation of I liter= 1.483000 grams.

Resulting from the analysis, it is computed that I liter of this water at 50° C. contains in solution:—

Content.	Weight.
Cubic centimeters.	Gram.
Co ₂	0 004000 .013828 .576647 .324140 .538121 .012000 Trace. 0.032000 Trace. Trace.
Total	1.500736

Both these springs, it is claimed, have a decided medical value, and are largely used by the natives both for bathing and drinking purposes.

At Angaqui are other springs of a sulphurous nature, and in the eastern portion of the province are also many saline and hot springs, all of which constitute a feature of this and much of the rest of the Island of Luzon.

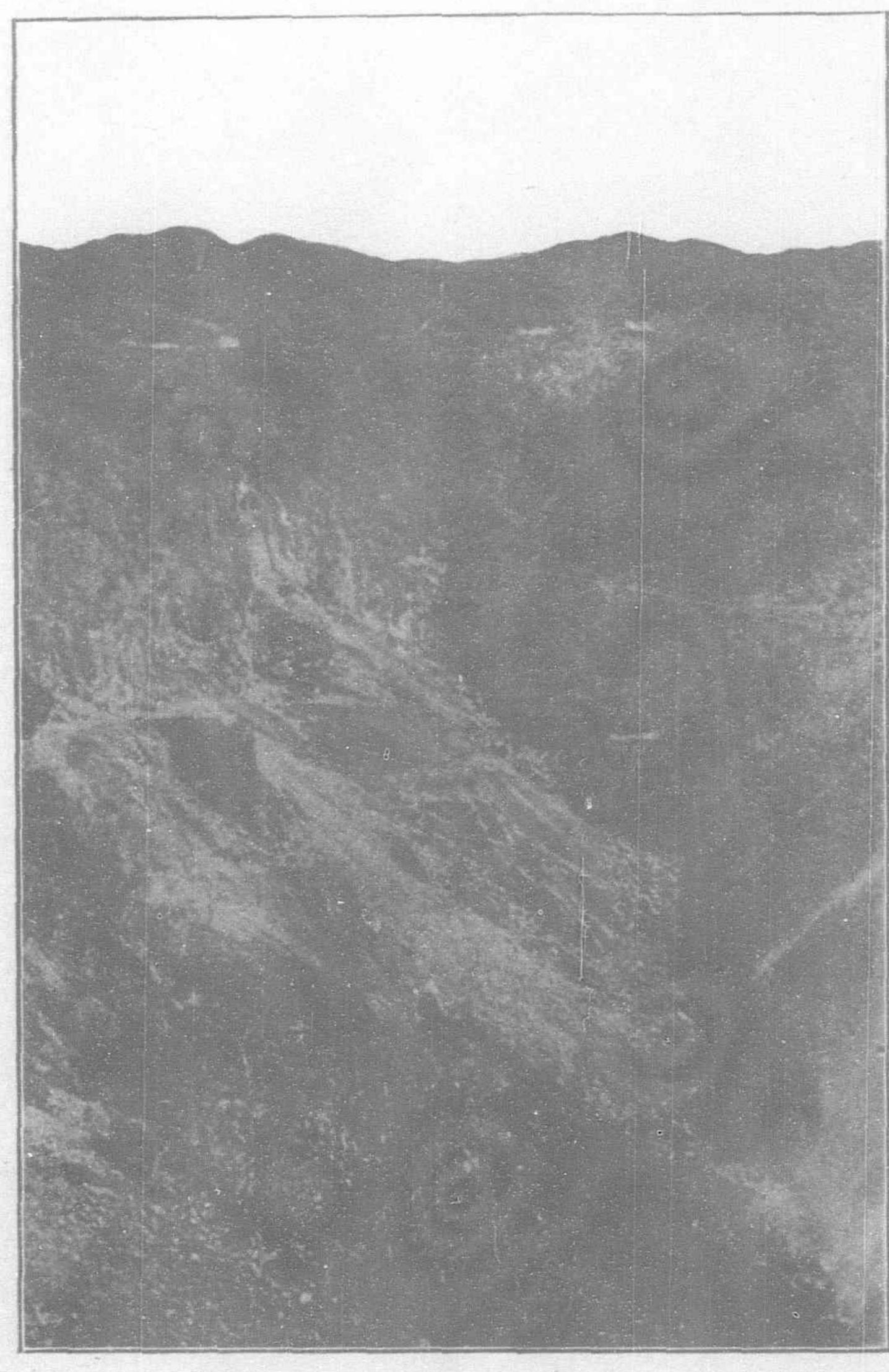
CHAPTER V.

GENERAL GEOLOGY; LOCAL AND STRUCTURAL.—The geology of the limited area in which ore deposits are found is dependent, similarly to the topography, to a considerable extent on the general conditions of Northern Luzon. Up to date but little has been known of the geologic conditions north of the central

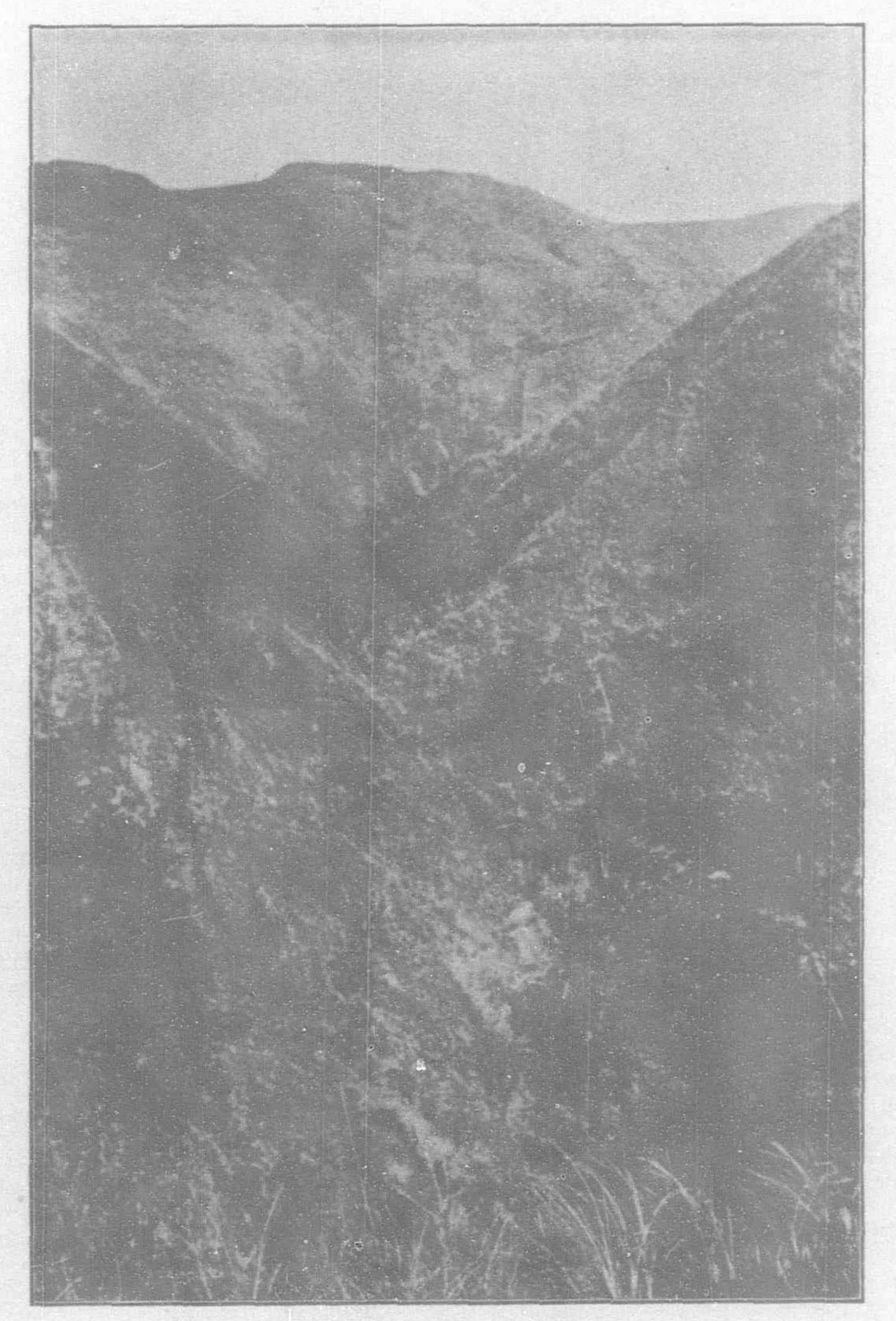
plain of Luzon, and, aside from disconnected notes made by occasional visiting geologists, the geology of the entire northern part of Luzon was mere conjecture. The Spanish authorities made an occasional visit to certain localities, one of which (Hernandez's inspection of the Lepanto area) has already been noted, and, noteworthy among the others, Mr. R. von Drasche visited this area in 1875 and gave to the public his observations. Before these observations and deductions of Von Drasche, rapidly made but showing a thoroughly trained mind, the views as to the constitution of this part of the island were quite at a loss for some facts to tie to. Semper speaks of the trachytic core of the island, and the adjacent and overlying sedimentary strata of recent age. J. Roth, a short time later, compiling the information available at that time, states that "on a formation of crystalline schists' lie the Tertiary strata. Roth's conclusions were drawn from the observed occurrence of schists in the Islands of Cebu, Leyte, Mindanao, and in the Camarines Provinces of southern Luzon, and also the occurrences noted by Itier of stream pebbles at Angat, in Bulacan Province.

Mr. Becker in this report, which gives us the most complete and concise statement of all known information, draws the inference that the crystalline schists are predominant in the basal mass of the Islands; and reasoning from analogous conditions in Borneo, and the observed facts of the known occurrences of ore deposits associated with schists or crystalline massives, he so summarizes the previous observations.

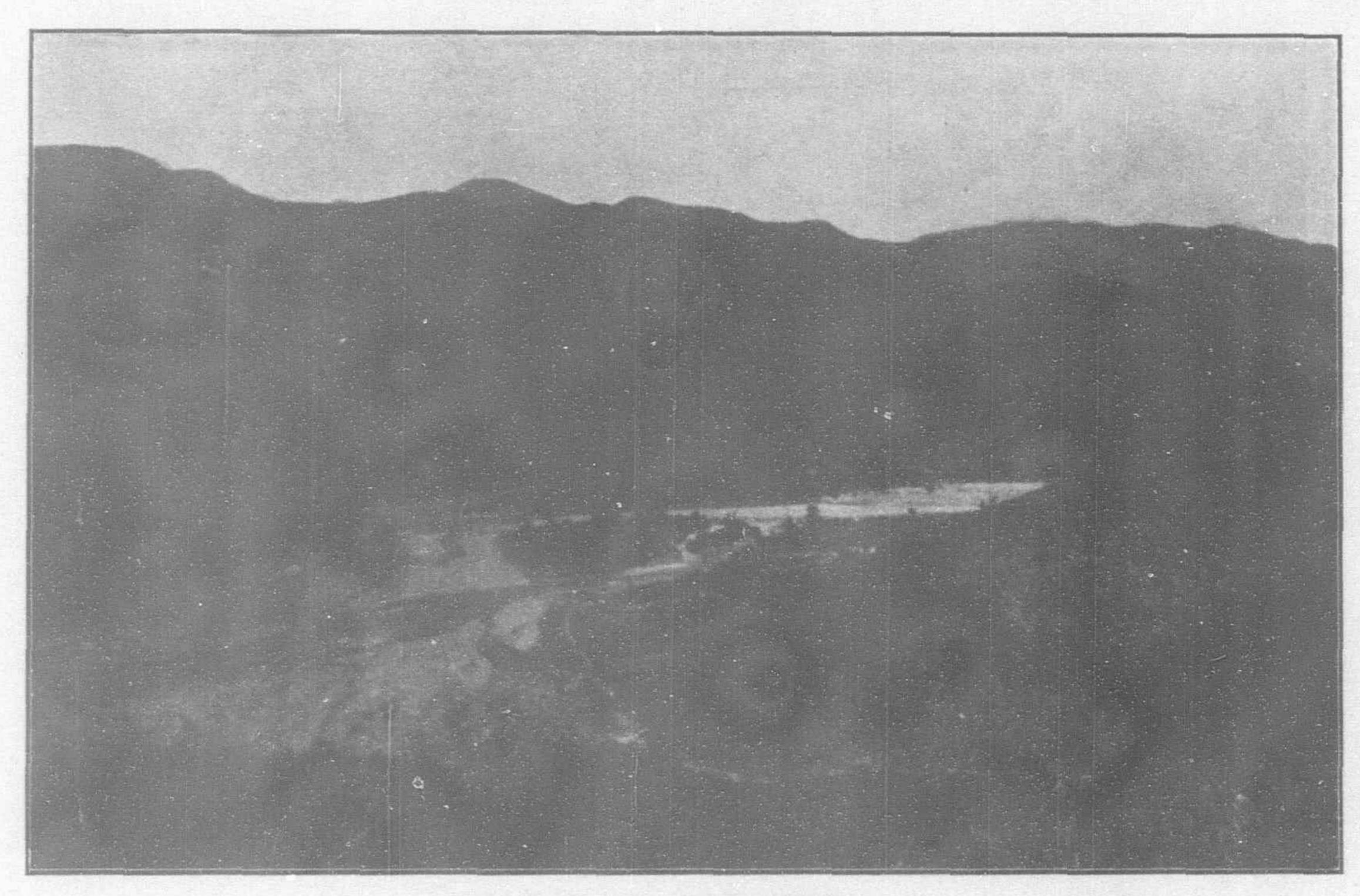
From the slight amount of work already done it seems probable that the schists do







TOPOGRAPHY ON GILONG CREEK



ABRA RIVER AT COMILLAS

not occupy as important a place as taken for granted by Mr. Becker, but that, as Abella generalizes, the diorites and dioritic rock in general are the oldest rocks, at least N. of the great plain of Luzon. As far N. as the Province of Abra, my observations have borne this out, and in this region, W. of the Cordillera Central, no schists have been observed.

From the W. coast of Luzon, particularly at Candon, the point on the coast at which the party disembarked, to the Cordillera Central, at the mass of Mount Data, the general relations of the rocks are as seen by a reference to the ideal section. The sedimentaries outcrop a mile or so E. of Candon, at that locality dipping 40° NW.; between Candon and Concepcion gentle folding has taken place, and the valley of the Balidbid River exposes recurrent anticlines and synclines, the region bearing a striking resemblance to the Potomac River valley and others of like type in the Piedmont area in Pennsylvania, Maryland, and Virginia.

At Concepcion, which is situated in a flanking valley at the foot of the W. slope of the range, the tilted sedimentaries are a prominent feature of the landscape. Great jagged blocks are tilted up against the main mass of this range, giving the slope a peculiar flat and geometrical effect.

At the crest of the Cordillera del Teila, as the coast range at this point is called, appears a great thickness of limestone, dipping to the southwest, and below it a heavy, thick conglomerate, cropping on the eastern scarp. The upper limestone, of a thickness of hundreds of feet, forms the crest of the range for an unknown distance; no fossils were collected during the hasty march, but in all probability search will reveal some organic remains; Santos quotes Semper as authority for the determination of nummulites from these beds, in abundance, and for the statement that the nummulites "have up to now occurred in the Eocene (paleo thérico de M. Cordier) or in the immediately adjacent Upper Cretaceous." Becker cautions the geological observer from inferring an upheaval from inclined stratification, but on account of the adjacent conglomerate and slates it is fairly certain that the tilting of the limestone may be traced to structural causes, and that the question of coral growth and pseudo-stratification does not enter here.

The basal conglomerate is also of great thickness, and, while on stratigraphical grounds it may not as yet be correlated accurately, it would appear from the continuity of these sedimentaries, observed from occasional peaks in going to the S. through Benguet, and on lithological grounds, that these are the extension of the Agno beds of Von Drasche. In the Agno River they are described by Von Drasche as consisting in the lower portions of coarse breccias and conglomerate of dioritic rocks, very coarsely bedded, with pebbles often of enormous size.

Regarding the ages of these rocks nothing can be said except the deductions already made by others. In the present work economic problems were of the first importance and these sedimentaries apparently have no specific connection with the ore deposits of Lepanto. Von Drasche first classed them as primitive, then Paleozoic. Later, Abella seems to have obtained fossils in the upper strata, of shells of surviving species, and lignite, and adopts the hypothesis that these Agno beds represent the basal conglomerate formed during the Miocene subsidence of the Philippine group.

Mr. Becker remarks in this connection that "it is tempting to seek in them (the Agno beds) the equivalent of Mr. Verbeek's breccia stage of the Eocene, which consist of unfossiliferous strata underlying Stage a; but the absence in the region of Benguet of the Cebuan lignitic series and the character of the organic remains appear to indicate that this portion of Luzon was above water during Eocene time." It may be possible that the tentative suggestion of this correlation may be later worked out, as it has happened that lately a small seam of lignite has been discovered on the Benguet road in this region. As it was not seen, its relations to the Agno beds are not known, and the coming field season in this area may throw some light on the subject.

The valley of the Abra River is cut, from these sedimentaries on the west to the Cordillera Central, in igneous rocks of various composition. With the exception of an olivine basalt (?) noted near Cervantes, no general lines were followed until the Mancayan district was reached.

Here, after study of the area, the structure reveals an underlying diorite, the occurrence of which again confirms Abella's deductions.

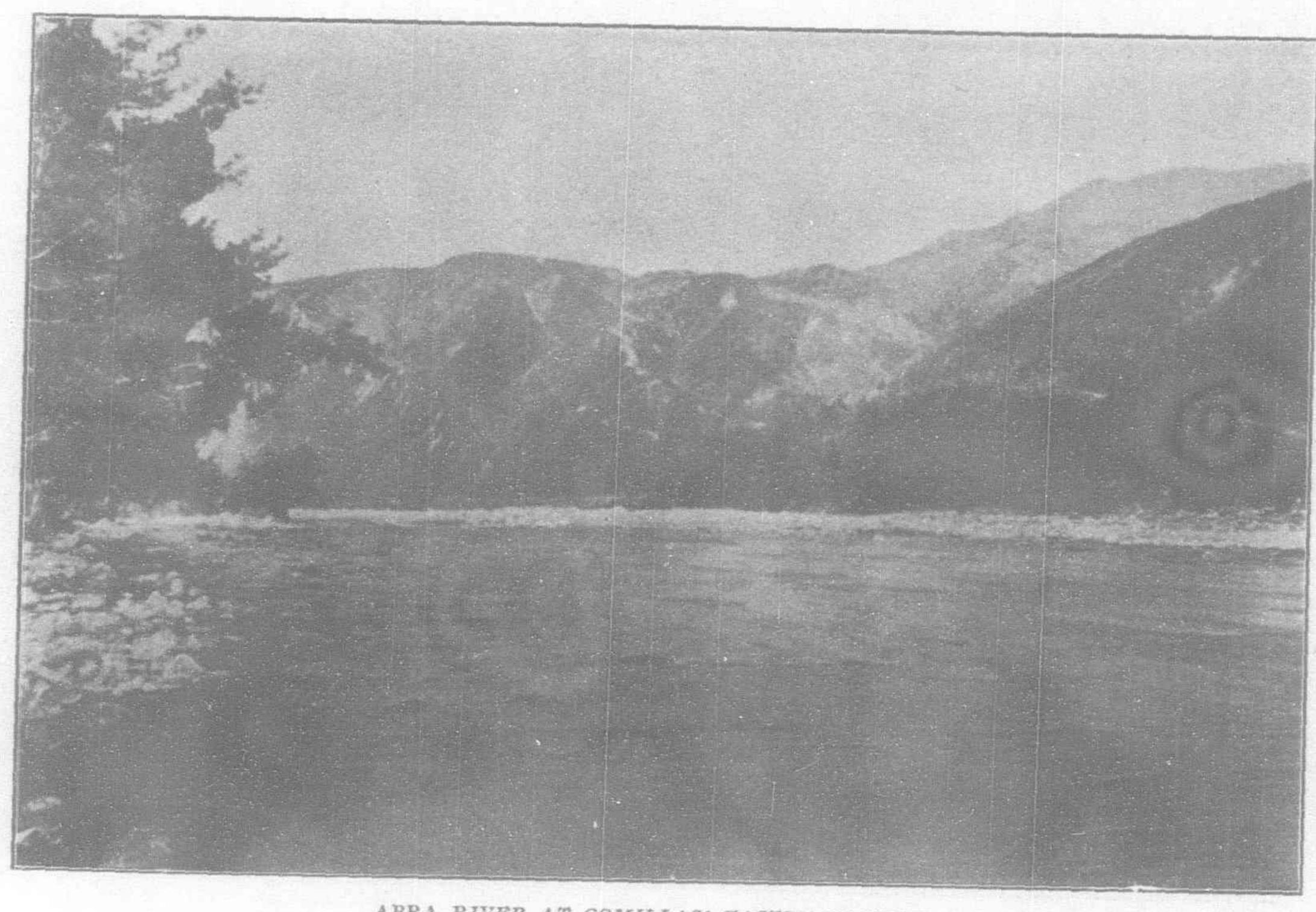
Various igneous intrusions have taken place in the basal diorite, one of the most noteworthy having a considerable expanse immediately W. of Mancayan, the Mancayan River roughly following the contact between the two for a mile or more. This mass seems to have no relation to the economic aspect of the region, and, except for a description of the rock (called the Bagan granite, from its oc-

currence on the mountain of that name), will not be noted further. Other intrusions, and especially a mass at Suyoc, seem to have some bearing on the ore deposits and will be taken up. Except for the more important rocks of those having a direct bearing on the economic problem of this district, geological work on the rocks of this region will be reserved until suitable mapping may be done.

One of the most important masses, however, is the trachyte of Santos and von Drasche, which predominate to the E. of Mancayan. The basal diorite, named the Mancayan diorite from its best exposures in the river of that name, is overlain to a variable depth, by a crystalline, neovolcanic rock, classified, as stated, as sanidine-trachyte by Von Drasche, and by Santos expressed as porfido arcilloso; this Mr. Becker translates as argillaceous porphyry, and interprets as a quartzless, partially decomposed lava. This igneous rock outcrops on the W. side of the hill on which is situated the Town of Mancayan, and the contact follows a N.-S. approximation through Suyoc into Benguet. The same rock was observed at the town of Daklan, in Benguet, over 30 ms. S., and is evidently some extensive lava flow of late age. Facies of this occurrence were observed on the western slopes of Mount Data, and from the topography and structure of the region it is thought that the source of the outburst should lie to the E. Mount Data has been alluded to generally as an extinct volcano, and mention is made of a crater lake at its summit by Meyer. He states that he ascended Data (in 1882), measured its height by barometer as 2,245 meters, and found a lake 1,100 yds., in diameter on a bench on the eastern slope of the highest part of the mountain.

None of those who have given to the public notes this region have made mention of sedimentaries on the W. slope of Data. These clays and limestones were observed in a river cutting the base of Mount Data, dipping about 20° to the E. Over the upturned edges of these rocks, which have a section of some 500 or 600' exposed by waterfalls, spreads the trachyte of Von Drasche, and the upper portion of the mountain is, a far as is known, of the same material.

Judging from the structure, therefore, it is at least open to doubt if the mass of Data, as generally supposed, is the remains of an extinct volcano, or whether Data is the residual mass left by erosion of the eastern limb of the broken anticlinical arch added to by later volcanic action, either intrusive or effusive



ABRA RIVER AT COMILLAS; EASTWARD VIEW

It is certain, however, that limestones and a small seam of coal do outcrop on the eastern flank of Data and that at Cayan, or its vicinity, E. of Cervantes, the limestone is again met with, these limestones containing numerous forminifera (nummulites), acording to Semper. If Data is of volcanic autogenesis, the activity was probably of a laccolithic type, intrusive, and not of the general mountain-building type prevalent generally in the Islands.

Rocks.-The massive igneous rocks of this locality are represented by diorite, granite, quartz porphyry, trachyte, and one or more varieties of igneous intrusions that are not described. It is unfortunate that many rock analyses and determinations could not be obtained in time to be of service as data for this report, and also that in spite of every effort it was found impossible to prepare thin sections of one of the most important rocks in the district, the trachyte of Von Drasche. Due to the decomposed nature of this mass and the somewhat limited mechanical facilities at service, no satisfactory section of this rock is ready, and the additional lack of analyses prevents more than a megascopic description of it.

Mancayan Diorite.—The diorite of this locality, the Mancayan diorite, is, on megascopic inspection, a dark-green granular rock, coming well under the field classificatory name of diorite. Within the Lepanto area it is uniform in texture and structure, showing unusually little of the variability of dioritic types. As noted before, the same type is noted in Benguet and other areas, and there are good grounds for believing that the diorite is a widely extended mass.

The relative size of the hornblende and feldspar give the rock its color, and in a hand specimen the amphibole is apparently predominant. On weathered surfaces, however, the feldspar stands out in light-colored lath or rod-shaped crystals, within a matrix of the amphibole. No other minerals are noted, megascopically.

In the examination of the thin sections there is revealed a plagioclase, in rod or lath shaped crystals, involved in a matrix of green horn-blende. The plagioclase, as seen on symmetrically cut wins, is apparently labradorite, evidently of earlier formation than the horn-blende. This reversal of the normal order of crystallization produces the pseudo-ophitic structure noted. The feldspar is white, cloudy, with dull, earthy luster; no zonary banding observed in the limited sections and no kaolinization to a great extent.

The next important mineral, the hornblende, occurs in flakes and very fragmentary masses surrounding the feldspar lathes; light green in the section and has a low extinction angle which can not be exactly determined, owing to the fragmentary nature of the mineral. No uralization was noted, though the transposition of gabbros or diabases to his diorite may not be positively denied.

No quartz present, nor mica. Olivine occurs in rounded grains in the hornblende, showing slight alteration. Magnetite also noted, in typical forms.

Four analyses of the Mancayan diorite follow:

	No. 1.	No. 2.	No. 3.	No. 4.	
Moisture, 110° Loss on ignition. SiO Al.O Fe.O Fe.O CaO MgO Na.O	0.50 2.74 50.67 21.21 11.31 .21 6.86 4.10	Per cent. 0.28 1.38 51. 18.01 .23 .9.39 8.80 6.53 .43 4.42	Per cent. 0.38 .70 47 98 18.94 7 08 3.98 11.01 7.06 .44 2.56	Per cent. 0.12 2.26 47.94 21.96 2.48 3.42 12.63 6.83 .19 1.49	
Total	99.11	100.51	100.13	99.35	

Local variations may possibly explain variation in these analyses, in the instances of the lime and ferric-oxide content. The lime appears rather above the normal for this type of rock, as are the alumina and magnesia to a lesser degree. The remaining constituents appear about normal.

BAGAN GRANITE.-This intrusive mass, the contact of which with the Mancayan diorite is followed by the Mancayan River, west of the town of the same name, is a light-colored, medium and evenly grained rock, seen by megascopic inspection to consist of quartz, orthoclase, and hornblende. It is evidently holocrystalline, and typically granitoid in texture, coming under a granite in a field classification of phanerites. At its contact with the Mancayan diorite, sharp and clearly defined, from interfingering of the two masses, most of the places seen indicate that the granite is later than and intruded into the older diorite. Alteration or metamorphic action has taken place only to a very limited extent, and in many instances sharp angular horses of the diorite are included in the granite, near the contact, with no change whatever.

Under the microscope this rock is readily classified as a hornblende granite, showing quartz, feldspar, and hornblende only, in the slides examined.

The quartz is typical of similar occurrences elsewhere—xenomorphic colorless grains and masses, glassy in its pelucidity and clearness with numerous dust particles and gaseous inclusions.

Both soda and lime feldspars occur, with orthoclase predominant, in simple crystals, and numerous twins. Little of the feldspar is fresh, and it shows the typical decomposition structure, with well-marked cleavage planes and pearly luster.

The hornblende is also normal. Irregular masses, showing prismatic cleavage; the ordinary green variety is predominant, and occurrence of glaucophane (?) is noted. Other facies of the same rock give the more common brown of the hornblende, and in these some slightly more idiomorphic forms are noted.

Magnetite and possibly other iron minerals occur in abundant groups of crystals. There are also small inclusions, indeterminate, of a highly refractive mineral, which suggest possible titanite. Apatite occurs in small amounts.

Analyses of this rock follow:--

	No. 1	No. 2	No. 3
	Per cent.	Per cent.	Per cent.
Loss on ignition Silica (SiO.) Alumina (Al.O.) Ferric oxide (Fe.O.). Ferrous oxide (Fe.O.). Lime (CaO Magnesia (MgO) Potassium oxide (K.O) Sodium oxide (Na.O).	0.02 .39 77.21 15.38 .72 .93 2.18 .42 .50 2.26	0.13 .84 73.56 1.42 1.27 14.30 2.50 .79 .88 5.09	0,20 1 01 71.80 2,46 1,93 14.28 2.96 ,22 1,54 3.02
Total	100.01	100,28	99.42

QUARTZ PORPHVRY.—This rock, the mass characterized by Santos as porfido argilloso, or argillaceous porphyry, as Becker translates it, occurs on the western side of the Mancayan hill, resting on the Mancayan diorite beneath. This one outcrop extends a distance of several miles, disappearing N. and south under the trachyte which covers it at Mancayan. There are to the N. several smaller outcrops, isolated masses or islands, and the whole mass has been the subject of considerable conjecture and limited study, having, as it does, a direct bearing on the ore deposits of the copper region.

Santos describes it as "a quartzose mass in a vertical position, not more than 80 or 100 meters in thickness which strikes NW., and is exposed at the SE. by a great cut, partly



FLOOD PLAIN OF ABRA RIVER AT COMILLAS

due to the mining operations of the natives. Toward the NW. it is partially concealed and disappears under argillaceous porphyry (porfido argilloso), which is more recent. The siliceous mass is of the same character throughout its extent; it is sometimes compact, sometimes crystalline, often porous, and always charged with iron pyrite. It contains decomposed feldspar in irregular veins, or porphyritically disposed. The croppings are of columnar form. The whole mass is fissured or jointed in different directions." Mr. von Drasche later visited this locality, but could not discover the rock relations. He speaks of the rock as a rhyolitic quartz-trachyte, which shows flow structure, with variations in the color of the ground mass from dark gray to red. In this thick, hard, splintery ground mass are quartz fragments, extremely numerous. They are never rounded nor do they show other than a regular character; they attain a thickness of 4 millimeters. Thin 'sections gave him no clue to the nature of the ground mass, but he states that it is evident that the quartz fragments have not come from the ground mass, and that they were wrapped up by the still fluid magma.

The two descriptions already given cover fairly well the general aspect of this rockit is a hard, flinty, red to yellow-white quartz leucophyre with prominent quartz phenocrysts. Nothing can be made of this ground mass with the naked eye, and the study of the thin section reveals little but that it is extremely siliceous. The quartz seems to be perfectly clear and often perfect in crystalline form, and the doubly terminated hexahedron predominates. There is little or no superficial weathering of the rock mass, though the entire rock shows great alteration, and is without doubt a product of metamorphic processes. Under the microscope the porphyritic nature of the rock is more clearly visible-whole and fractured quartzes set in a quartz-feldspar paste from which little can be determined. Spaces of dissolution are a prominent feature of the rock, occasionally giving a cellular structure, and the presence of pyrite and magnetite is everywhere noteworthy.

From the few sections at hand, none of which proved to be entirely satisfactory, little positive information could be gathered. It does not appear, however, that Mr. Santos's conception of the mass can be regarded as correct; careful search was made for the columnar structure he noted, but beyond a series of cross fractures which form a notice-

able characteristic of the exposure, it is certain that he must have been misled. Similarly, there is not the slightest hint of sedimentary origin in any of the exposures or thin sections examined.

Mr. von Drasche's necessarily hasty observations, leading to the view that this mass is a lens of quartz embedded in the trachyte, are not substantiated by a more careful study of the structure of the region, and hence this view is regarded as improbable.

All the evidence at hand points to a contact zone of limited extent, produced by the Mancayan diorite being covered by a considerable flow of the trachyte. Both microscopic and megascopic evidence show that the quartz porphyry is not original as such, and that but little of it, except the quartz, has existed unchanged since its formation.

Three analyses of the quartz porphyry are

given below:--

	No. 1 Per cent.	No. 2 Per cent.	
Loss on ignition, Silica (SiO ₂) Alumina (Al ₂ O ₃) Ferric oxide (Fe ₂ O ₃) Ferrous oxide (FeO) Lime (CaO) Magnesia (MgO) Potassium oxide (K ₂ O) Sodium oxide (Na ₂ O).	0.22 1.24 89.49 4.88 4.24 .05 .04 .32 .08 .25		0.00 3.18 87.96 3.75 3.83 .69 .08 .23 .11
Total	100.81	99.30	100.28

TRACHYTE. -- Covering all to the eastward of a line from Mancayan to Suyoc, and apparently over a much greater general area, is a rock which Von Drasche classifies as a hornblende-sanidine-quartz-trachyte, and from lack of other than megascopic inspection for a guide, that name, or more simply quartztrachyte, expresses the rock as nearly as may be.

It is a much-decomposed granular-to-porphyritic mass, which weathers to varicolored clay, giving an appearance to the soil which may not be mistaken. In all the field work no absolutely fresh specimen could be obtained and those collected have altered in the labora-

There is present a noticeable amount of quartz in clear, rounded, fracture grains and prominently in doubly terminated hexahedrons; feldspar in short, tabular crystals, much decomposed; clear sanidines with typical luster and twinning; a ferro-magnesian mineral, indeterminate as to amphibole or pyroxene, in somewhat noteworthy amount; occasional biotite; considerable magnetite. The placing

of the feldspars in the general mass gives the typical orthophyric structure, as opposed to the more common trachytic structure; the proportion of ground mass varies locally, but in all cases it is subordinate to the phenocrysts, approaching a pronounced granitoid texture in cases.

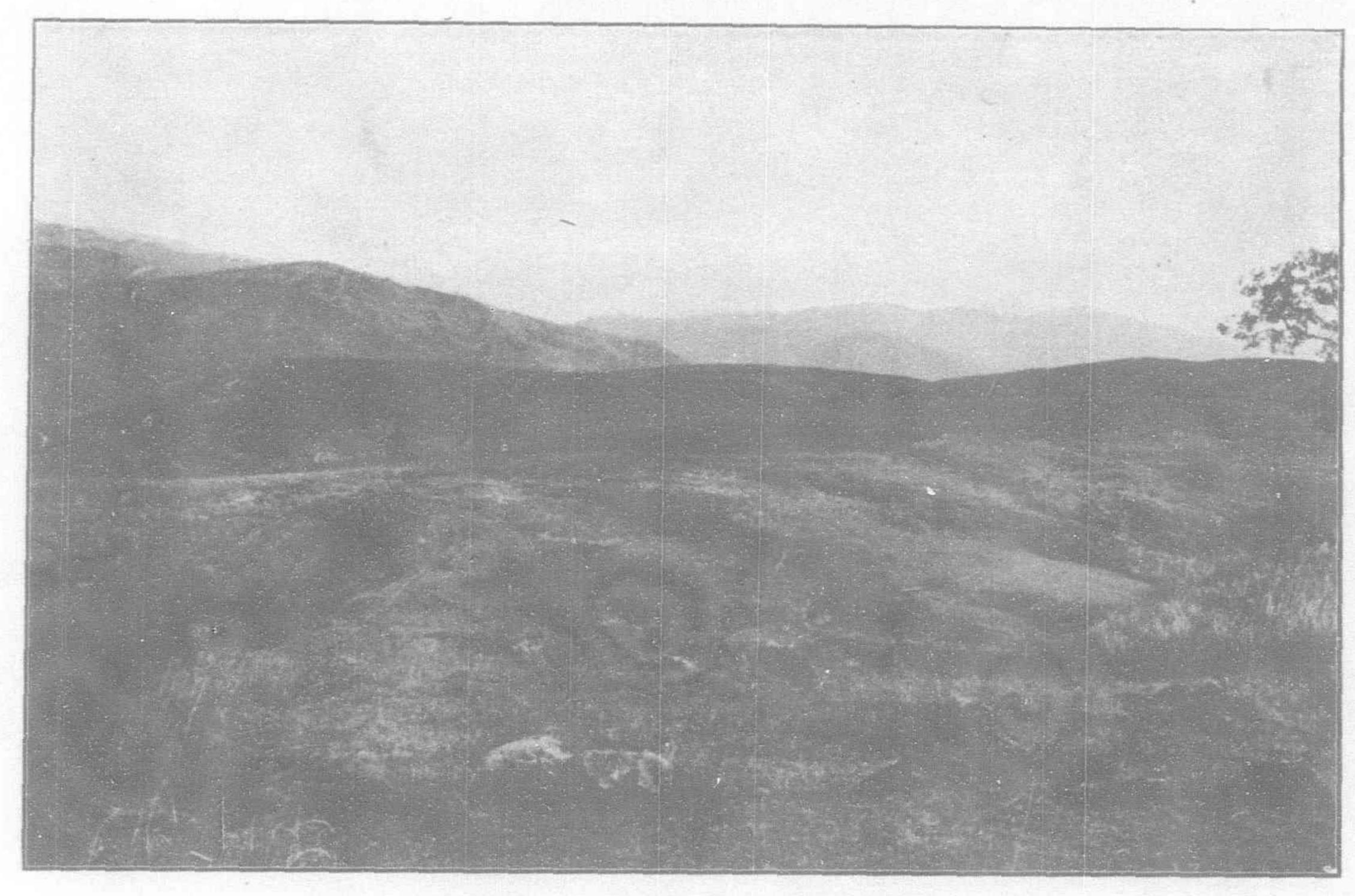
Below are given several analyses of the rock, made from imperfect field specimens. With no microscopic examination possible, and only the aid which the divergent and not representative analyses give, it appears that more exact determination may better be left to more detailed work in the Mancayan region. The name given by Von Drasche appears to be sufficiently definite for the purposes of this report and the rock will be so designated.

A	lnalyses.		
	No. 1	No. 2	No. 3
	Per cent.	Per cent.	Per cent.
Moisture Loss on ignition Silica (SiO ₂) Alumina (Al ₂ O ₃) Ferric oxide (Fe ₂ O ₃) Ferrous oxide (FeO) Lime (CaO) Magnesia (MgO) Potassium oxide (K ₂ O ₃)	4.82 54.80 19.29 1.83 2.54 8.21 3.11 2.50	18.18	3.83 2.28 60.48 18.11 3.14 1.67 4.94 2.12 1.38 2.40
Sodium oxide (Na ₂ O)	100 23	99 36	100 30

(To be continued.)

MINERALS OF BORNEO

Borneo is a country, says The Mining Journal, the size of which makes it worthy of consideration for prospecting operations, and when to its size there is added the mountainous and impenetrable character of much of the country, and the small European population, it is clear that much mineral wealth may still lie undiscovered. The island is divided between the Dutch, the Rajah of Sarawak, the Sultan of Brunei, and the British North Borneo Company, the three latter administrations comprising the British sphere of influence. The mining industry in the Dutch portion of the island is the most important, and some attempts have been made to study the general features of the geology of the country. It seems doubtful, however, whether apart from the prospects for the petroleum industry on the E. coast, the commercial prospects of mining are favorable. Details on the subject in this country are scanty. A detailed account of the gold mining industry in Borneo was given by Mr. S. J. Truscott



TOPOGRAPHY IN THE VICINITY OF CERVANTES

in a paper read before the Institution of Mining and Metallurgy some years ago. At that time three centers were mentioned:-Sambas, in West Borneo, not far distant from the district in Sarawak where gold mines are now being worked by the Borneo company; another in Central Borneo at the sources of the Kahajamg and Kapuas rivers; and the third about Martapoera in the SE. Gold mining in the Dutch Indies had a marked boom during the 90's, hundreds of companies being said to have been floated. In 1904, however, only three Borneo concerns appear as producers of any considerable quantity of metal-viz.; the Kahajan 126 kilos., the Sambas 47 kilos., and the Loemar 26 kilos. The Sambas District is said to contain a good deal of ground suitable for dredging, 2,749 tons of steam coal was mined in the Poeloe Nangka Concession, and 5,875 tons in Kotei, which also produced 131,810 tons of crude oil. Besides the mineral products worked, diamonds, platinum, quicksilver, iron, and tin have been found. The most prosperous operations at present carried on in the island appear to be those of the Borneo company at Bau and Bidi on the Upper Sarawak River. The output for 1904 was 41,290 fine ozs. The first named group of mines has been worked regularly since 1898, and has yielded to the end of 1903 87,182 ozs. of fine gold, averaging 3.88 dwts.; in 1904 the average had risen to 5.2 dwts.

The mines are in many ways interesting, and were recently visited by Mr. J. B. Scrivenor, geologist of the Federated Malay States, with a view to comparing the deposits and the conditions under which they are worked with those in Malaya, from whose report the following details as to these mines are derived. Operations hitherto appear to have been chiefly open cast, to the possibility of which and to the accessibility of good fuel is, no doubt, to be attributed the profitable working of the low grade of ore. So far the deposit appears to have been proved to a depth of 93' at Bau and 120' at Jambusan, where the breccia conveying the gold occurs in a fissure in limestone country. At Bidi the ore is of somewhat higher value, five samples quoted by Mr. Scrivenor, and stated to be above the average value, show a yield of 18 dwts., while at the Su San Shien mine at Ban the assay runs from 15 dwts. to 11/2 ozs. The gold occurs in different formations, but it is derived, in Mr. Scrivenor's opinion, from igneous dykes, which where examined, were found to carry

up to I dwt. The richer ores often carry a considerable amount of arsenic-as much as 14 per cent in some of the cases mentioned, while the Su San Shien ore is pyritic in character. The ground treated consists of loose soil, clay, mud, as well as lumps and blocks of the mineralised breccia from which the other materials have presumably been weathered. The breccia is broken in some cases from 2 to 1/2" size, which is apparently all the crushing necessary, and the whole product is then fed into the cyanide vats with a small quantity of lime. One of the most important features in connexion with these gold occurrences is that in most cases they show no visible gold; in fact, in many respects the deposits seem to resemble some of the occurrences described by Mr. Braddon in British Guiana. The ore worked at present has, according to Mr. Scrivenor, been largely affected by surface enrichment. At Tegora, in the same district, there is an old mine where cinnabar was worked by the Borneo Company for some years with good results. Occurrences of the following have been noted in Upper Sarawak: gold, silver, ciunabar, calomel, arsenic, antimony, lead, zinc, copper, manganese, pyrites, and diamond. Reference has been made to the gold mines being favorably situated as regards fuel. This is obtained from the government mines at Sadong, about 18 ms. up the Sadong River, whence it is carried some 20 ms. along the coast and then up the Sarawak River to the mines. The coal is ordinary black bituminous, burning well with little ash; it is, however, very smoky, and breaks up in firing, requiring special bars. The output is about 13,000 tons a year from a 2' 9" seam. Coal is also mined at Brooketon, chiefly for export to Singapore; it is, however, difficult to work, owing to its fiery character. Passing to the chartered territory there is little to note except coal mining. The British Borneo Syndicate, formed in 1902, were granted exclusive prospecting rights, but they do not appear to have met with success as yet. Manganese deposits are worked at Kudat, but their commercial value has not yet been definitely ascertained. Specimens of tin are said to have been discovered, but there is no information of any important find in this direction. Coal is, of course, worked in Labuan, and there are said to be important deposits at Cowie Harbor in the extreme SE. of the territory. As the chartered company imitates its better known exemplar in Rhodesia by requiring a large

proportion of the shares of any company operating mines, it has, perhaps, saved disappointment that mineral deposits of commercial value have not yet been discovered. As regards Brunei, which is, we believe, still under the administration of the native sovereign, no information touching mineral resources seems to be available. The whole European population of Dutch Borneo does not appear to amount to more than 1,000, and the British portion is probably less. Thus it cannot be supposed that we have any extensive knowledge of its mineral resources. The Chinese workings afford, of course, the chief prospecting data, and as has been proved in the case of Sarawak, their mining knowledge is too primitive for their work to be regarded as at all exhaustive in character. Physically speaking, the country is well supplied with waterways, and, of course, unlimited labor is available from China, and though as a whole successful mining undertakings seem scarce, the handsome profits made by the Borneo company may well attract attention to that district.

JAPAN'S RAILROAD EXPENDITURES

On the Seoul-Wiju Railway there has been already expended -Y-21,841,243, in which total is included the cost incurred in carrying to rapid completion the railway between Samlang-jin and Masau. To be still expended upon the Seoul-Wiju line in order to perfect it and bring it into the condition of a permanent road, Y20,040,900. Out of this last total, orders for essential materials have been given and labor has been undertaken to the extent of -Y-4,340,000.

On the Nasau-Samlang-Jin road the sum already spent, in addition to the money appropriated from the Seoul-Wiju fund, is -Y-1,191,356; on the East-Chinese Railway the sum already spent is -Y-29,174,910; the sum required to complete the work will be -Y-3,380,239. On the Antung-Mukden Railway the sum already spent is -Y-6,209,365. The sum required to complete the work is not yet definitely ascertained.

Adding up the above figures, it results that the amount actually defrayed out of the war funds for purposes of railway building is -Y-58,416,874, and that the amount still to be spent, so far as has been ascertained, is -Y-23,420,239. Probably the latter figure will ultimately reach a total of -Y-40-000,000 and the grand aggregate of expenditure will be -Y-100,000,000, approximately. There

can be no question about the very solid interests secured by this Empire in Korea and Manchuria. Another point emphasized by the figures is that when Japan asked the Peking Government for the concession of the Antung Mukden road she had already invested in the enterprise a very substantial sum, and the same was true on a much larger scale with regard to the Liaching-Chanchung line. The same argument did not apply at all to the Kirin-Chanchung road, and probably applied in only a very insignificant measure to the Hsinmintun-Mukden line, which had been constructed by the Russians.

KEROSENE OIL AND LUMBER IN MANCHURIA

In kerosene oil the American product has had almost a monopoly in the Manchurian market during the last 16 mos. At one time Russian oil threatened serious interference during Russian occupation of Newchwang, and at the present time the Germans, who are handling the Sumatra oil, claim to have brought to this market during the past season 439,030 galls., valued at \$11,325 gold. The Standard Oil Company imports during 1905 were, approximately, 2,482,700 galls., the custom house valuation being \$326,874 gold, which is very low, as will be seen by computing the relative value per gallon on the basis of the total estimated valuation. Of this quantity 1,130,710 galls, came in direct from the Atlantic seaboard. The balance was transhipped either by the Chinese or the Standard Oil Company via Shanghai. The Sumatra oil-producers are eager to establish a permanent business in Manchuria, and contemplate the construction of storage tanks, etc. The Standard Oil Company is auxious to provide adequate accommodations for its extensive and growing business, and is ready, just as soon as a suitable site can be secured, to build extensive storage facilities. Work on these new buildings will be begun this season.

During February, 1906, there developed a tendency on the part of the Sumatra oil promoters to cut prices. This may be found necessary to secure ready sales, inasmuch as the Sumatra product has a reputation among the natives for smoking and not being as desirable as the Standard Oil product. The oil imports for 1905 should be considered, however, in connection with the fact that between 2,800,000 and 3,000,000 galls. were carried over by the Standard Oil Company from 1904 to 1905. Again, 1,800,000 galls. were carried by the same company from 1905 to 1906. This is alleged to be mainly due to interferences to inland transportation facilities resulting from

the Russo-Japanese war.

AMERICAN LUMBER IN DEMAND. -- In lumber the United States was more prominently represented at Newchwang in 1905 than ever before. A considerable quantity came direct from the North Pacific Coast-Puget Sound and the Columbia River-and of a total importation of \$558,429 for the season, \$191,888 is credited to America. Japanese shippers brought in large quantities of poles, short timbers, and light-weight boards. The Chinese also contribute I to the imports. In all instances, however, the American lumber was found to be the best, and further importation will follow. While there are valuable timber areas in the Yalu River section of Manchuria, the indications are that for the present there will continue to be a growing demand for American lumber in Manchuria. With the introduction of modern sawmill plants in suitable sections of the Far East this demand may be supplied by the oriental product. All long pieces of lumber come from America. With the exception of a small amount of lumber manufactured at Shanghai-that is, a small amount as compared with the output of North Pacific Coast mills—the lumber of merchantable lengths and sizes reaching this market come from the Pacific Coast. Locally, logs are whipsawed by hand, and tongue and groove flooring is unknown. A fair quantity of American flooring was imported here in 1905, and gave the best of satisfaction. Sash, doors, and blinds are mostly made by hand during the construction of buildings, but in some instances all of these are imported from Shanghai, where they are manufactured by modern machinery. There are no wooden houses or buildings in Newchwang, and few in Manchuria. The bricks are of inferior quality, the price ranging from \$8 to \$11 per thousand.

DEATH OF MR. BEVIS

"We much regret," says The London and China Gazette, of May 11th, "to report the death of Mr. Herbert Maurice Bevis, an old and very well known manager of the Hongkong and Shanghai Banking Corporation. It will be remembered that Mr. Bevis suffered from a severe illness in Hongkong about 18 mos. ago and that on his recovery he proceeded home on leave. His death now at the age of 52 was, we regret to say, due to his own action. He had been depressed lately, and on the morning of 4th inst. he left his residence in Ashley gardens, Victoria-st., and went to his club at 86, St. James's st., where he ordered a bath. Before going to the bath room he asked the hall porter to send a boy on an errand. When the reply came no answer could be got from the room and the door had to be forced. At the inquiry which had naturally to be held, Mr. J. Howard Gwyther identified the deceased as his brotherin-law, whom he last saw alive a fortnight ago, when he was not at all well. Apart from his health there was no trouble of any kind. He had been given to understand that he felt no longer fit for active occupation, which he thought had become so intolerable that it affected his mental condition. Sir Francis Laking, who was called to the club, stated that the deceased had, while sitting in a warm bath, cut his throat with a new razor and was quite dead. There was a fullycharged revolver in the room, but none of the cartridges had been discharged. Dr. William Hartigan said he had known Mr. Bevis for a number of years. His whole nature had quite changed when he returned from China, doubtless due to his illness. On April 2d he consulted witness about going abroad again, and witness told him that he was unfit to go. The climate of China affected one mentally, and when a man broke down in health the previous effects of living there would come out very strongly. Such being the medical evidence the cause was attributed to temporary insanity. The following letter was found in Mr. Bevis's coat, hanging on the wall:-'74, Ashley-gardens, S. W. My Dear Gracie, -- What I am going to do is best for you. I made a wrong return in my income tax. I must have been mad, and suppose I am now. I told the bank to put the £5,000 Japanese Loan in your name, so you will have something to go on with. I hope the bank will treat you well as the wife of an old servant, for we have very little money left. Farewell to you both. I am truly sorry. -Yours truly.' (The letter was not signed.) There was also a letter to the bank with regard to the £5,000. Mr. Bevis had been for some 30 yrs. on the staff of the Hongkong and Shanghai Bank, and was well known throughout China and Japan, where his death will be regretted by many friends. He was last manager of the Shanghai branch. The funeral took place at the Brompton Cemetery on 9th, amongst the mourners present being the Rev. Henry Bevis (brother), Mr. J. Howard Gwyther (brother-in-law), Mr. Leslie H. Gwyther, Mr. Ernest Miller, and Mr. Noel Pike (nephews), Sir Thomas Jackson, Sir Ewen Cameron, and Mr. C. S. Addis (representing the Hongkong and Shanghai Bank), Mr. H. R. Coombs, Mr. A. P. Stokes, and Mr. Horace Harwood."

JAPAN'S MARVELOUS GROWTH

The French vice-consul at Hongkong has been watching Japan's increasing influence in the Far East, and in a report to his government on the subject, he says:—

"At Hongkong alone the Japanese import three quarters of the coal arriving there.

Japanese boats become more and more the carriers of copper. Till lately shipments of sugar from Hongkong to Japan were important. They have fallen from 33,000,000 to 3,000,000 kilograms, and Taiwan now produces enormous quantities of sugar for Japan."

The consul has found that it "is impossible to obtain from the interested parties any particulars on the methods of the Japanese merchants. Discretion with them is a rigid rule. The Japanese deal among themselves or with the Chinese from year to year, and accounts are squared once in the 12 mos., whereas with the Europeans business is done at from 3 to 6 mos. The rise of the Japanese commercial fleet has been phenomenal, and it now occupies the second position in the Chinese ports amongst the foreign flags. The tonnage of Japanese vessels entered at Hongkong has quite doubled since 1898."

What strikes the consul as most remarkable is the rise of commercial navigation in Japan, which has been at the expense of the British companies. It is said that Japan will no doubt establish in due course a Monroe Doctrine of her own in the waters of the Far East.

MACHINERY FOR JAPAN

Various new companies and extensions, involving a large outlay of capital, are about to be launched in Japan, and the following figures are of interest:-Capital required for companies being promoted to supply water power for electric-motor power, estimated at \$35,700,000 gold; for new electric light and railway companies and for extension purposes, \$9,825,000 gold, of which \$3,850,000 will be supplied from abroad; for extension of spinning mills, \$16,275,000 gold. Municipal enterprises in many cities involve an outlay of \$12,610,000 gold. New mining companies are also being floated. Their aggregate capital amounts to \$17,600,000 gold, of which \$8,850,ooo is to be raised by foreign loans. New railway and shipbuilding enterprises represent the sum of \$25,092,000 gold.

The imports of machinery at Kobé amounted in 1905 to \$5,148,000 gold, or over three times the value imported in 1904. Of all machines lathes made the highest increase, amounting to \$1,240,000 gold. Next follow machines for metal and woodwork, spinning, and electriclight plant, locomotives and electric motors. Each of these various lines showed an increase of over \$250,000 gold on the figures

for 1904.

Imports continue to increase, and the value of machinery imported during January last amounted to \$515,800 gold against \$330,600 for January last year. Almost every steamer arriving in Kobé from Europe has had consignments of machinery on board.

NEW FLOUR MILLS IN JAPAN

Agents for American flouring mill machinery manufacturers have recently sold complete outfits for four flour mills to be erected in Japan. Two of these mills have a capacity of 200 bbls. each per day, and are to be erected in Tokio. The other two are 60-bbl. mills, and one is to be constructed at Nagoya. Contracts for these mills have evidently been let on the belief that the new tariff bill increasing the duty on flour will become a law.

JAPANESE HARDWOOD PURCHASES

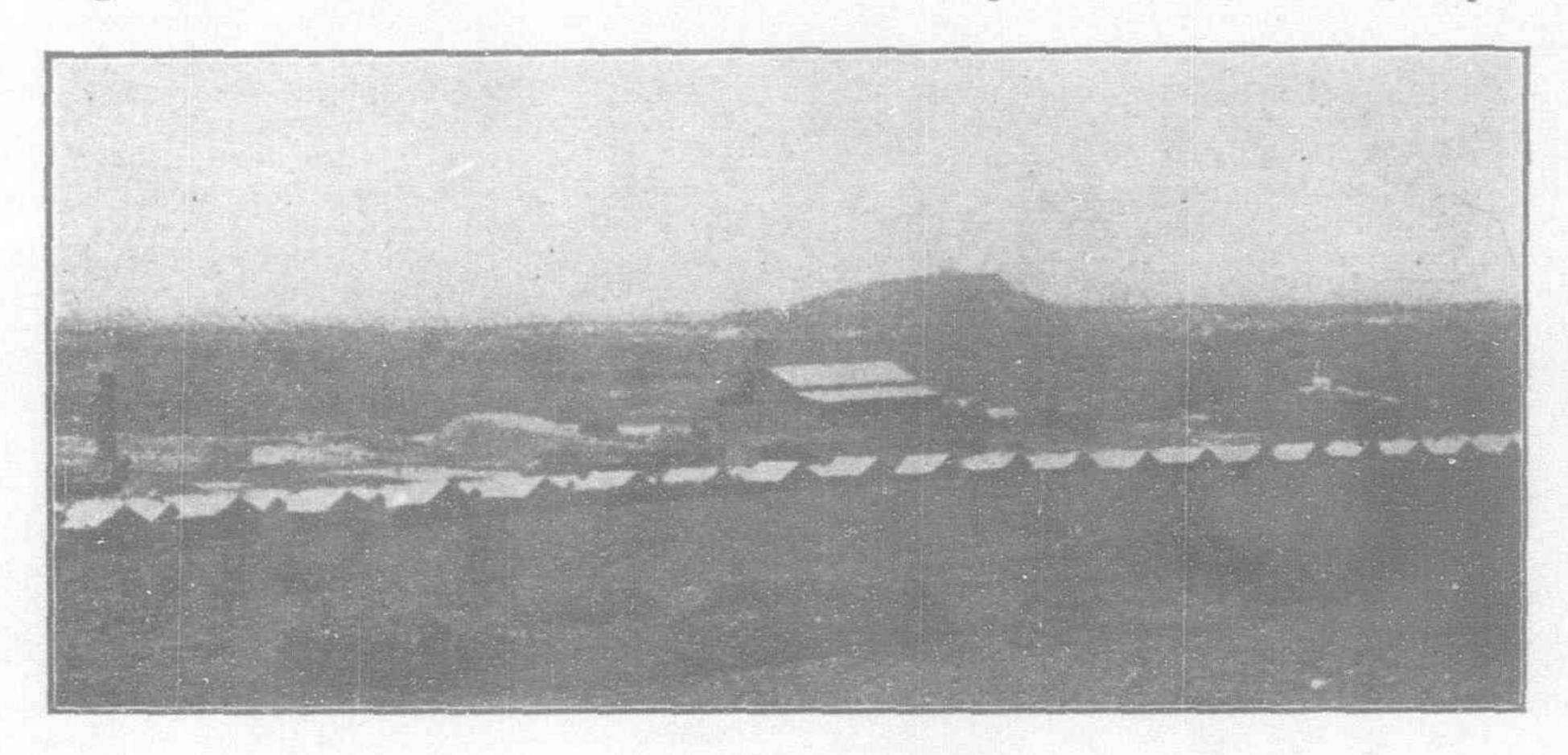
The Japanese importations of teak wood from Siam and Dutch India were, for 1905, \$368,466 gold, against \$73,445 in 1904, most of which was entered at Kobé. This gives an idea of the growing demands for hard woods for vessels, buildings, and the manufacture of furniture. Teak logs arrive in 17' to 45' lengths. Teak planks of 15' to 25' in length are 8" wide, 4" thick, and up, smallest size, while the 20' or more lengths are 12" to 20" wide and 21/4" to 6" thick, those 30' long running as high as 71/2" thick. They are required to be without worm holes or cracks. Teak deck planks must, likewise, be sound, and run from 20' to 30' long, 5 to 51/8" X 21/2 to 3 1/8".

LARGEST HYDROELECTRIC INSTALLATION IN SOUTHERN ASIA, MYSORE PROVINCE, INDIA—IV

(By A. C. HOBBLE)

There are 15 main feeder circuits from the low-tension (2,300-volt) bus-bars and extending in several directions over the Mysore gold fields from the low-tension distributing tower, which is located on the opposite side of the building from the transmission line entrance

high-tension rubber-insulated wires and cables bring about a rapid deterioration of the rubber (if the latter contain sulphur) through the formation of sulphuric acid which eats away the insulation. Owing to the static discharges it is also possible for nitric acid to be present.



MYSORE GOLD MINING COMPANY'S DISTRICT, SHOWING STAMP MILLS AND LINE OF COOLIE HUTS

towers. The maximum length of distribution circuits from one end of the gold fields to the other is about 5 ms. Altogether there are some 15 ms. of feeder circuits. Each feeder circuit is equipped with lightning arresters at the outgoing end, while at the motors both lightning arresters and fuses are provided. Each main feed circuit is protected by an automatic relay which instantly trips the 2,300-volt oil-switch in case of very heavy overloads or short-circuits. In the new construction these relays are conveniently located on the front of the feeder panels of the main switchboard.

TROUBLE IN TRANSFORMER STATIONS .-Some trouble has been experienced in both transformer stations with static discharges or leakage from high-tension rubber-insulated conductors where they came into loose contact with porcelain or other insulating bushings. Rubber, even of the best quality, deteriorates more rapidly in this and in other tropical climates. Owing to the prohibitive price of pure Para or india-rubber, inferior grades are often used for the insulation of electrical conductors. Most of the inferior grades of rubber contain more or less sulphur. It is now well known that pure rubber deteriorates more rapidly through oxidation than vulcanized rubber. Owing to this fact it is of the highest importance that all rubber-insulated conductors (especially high-tension conductors) should be thoroughly tinned to prevent the oxidation of the copper from affecting the rubber insulation. It has also been found from experience that static discharges from

Hence it is very important that the prospect ive purchaser of rubber-insulated electrical conductors should specify the quality of the insulation and the tests which the same must withstand, not omitting that the copper conductor must be thoroughly tinned. The cheapest reliable form of rubber-insulated wire or cable is that in which the tinned conductor is surrounded by a pure rubber layer, outside of which is the vulcanized rubber. The pure rubber layer prevents the sulphur from attacking the conductor. Hightension wires and cables insulated with many layers of good quality varnished cambric have given excellent satisfaction and are much preferred to rubber insulation for high-tension work, especially in the tropics.

It has been observed that in those cases in which the rubber-insulated cable passes through porcelain bushings, the static discharge is accentuated and the rubber deteriorates rapidly. This trouble has been successfully overcome where the cable passes through vertical bushings by filling the latter with good quality insulating compound. This is not easily done where the cables pass through horizontal bushings. The remedy in this case is not to use any bushing whatever, but to have plenty of air insulation with rigid insulating supports. In case porcelain or other bushings are used, they should be of sufficient inside diameter to allow of ample clearance for the insulated conductor. This may be effected by using rigid insulating supports for the cable on either side of the insulating bushing.

Judging from experience it is not advisable to use glass insulators for high-tension currents above 20,000 volts, when such insulators are exposed to slight jars or shocks, such as are liable to occur when they are used as supports for disconnecting switches. Glass insulators used for this purpose are very apt to develop cracks or flaws. Such defects prove a high-resistance path to ground and it is only a question of time when the insulation gives away entirely. Glass for high-tension work must be perfectly sound and of good quality. Porcelain has been found much superior as regards mechanical strength, and if of a good quality is a highly satisfactory insulating material.

The iron casing of high-tension transformers, when such are located in isolated places, should not be grounded. Such grounds only increase the liability of a breakdown when abnormal pressures occur, as occasionally happens

Power at the Mines.—Champion Reef and Mysore mines, which together consume 3,500 h. p. from the Cauvery plant, have their own substation or center of distribution. In this way they have control of their own individual feeders. In this substation is located the necessary switchboard and switching apparatus for the control of 12 feeder circuits.

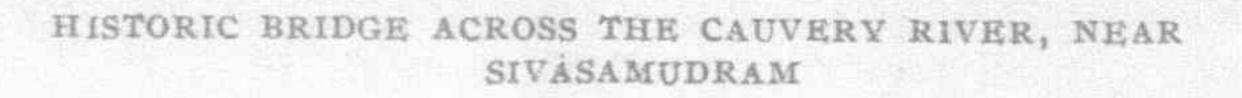
Besides the General Electric Company's motors there are to be found several Westinghouse, Sandycroft, Peebles and British Thomson-Houston companies' motors.

That the value of electricity in mines is realized and appreciated by the Kolar gold fields mining companies is apparent by the ever-increasing demand for electric power. Motors have been installed for driving air-compressors, pumps, and stamp mills, and it is to be hoped that the near future will see them installed in a larger unit for hoisting purposes. The electric hoist has reached a stage in which it compares most favorably with other systems, and in most cases is much to be preferred.

The advent of the Cauvery power installation has been the means of supplying much cheaper power, a more constant service, and a decided saving in many other respects to the mines. The grades of coal mines in India are of low calorific value, not averaging more than 65 or 70 per cent. Thus with the price of coal at \$6 per ton, steam is an expensive article for motive power. The present cost of electric power delivered to the gold mines by the Cauvery power scheme is £18 (less than \$90) per h. p.-year. In 3 yrs. this rating will be reduced to £10 (less than \$50) per h. p.-year. This will mean an enormous saving to the mines in cost of power, since great economy is effected at £18 per h.p.-year.

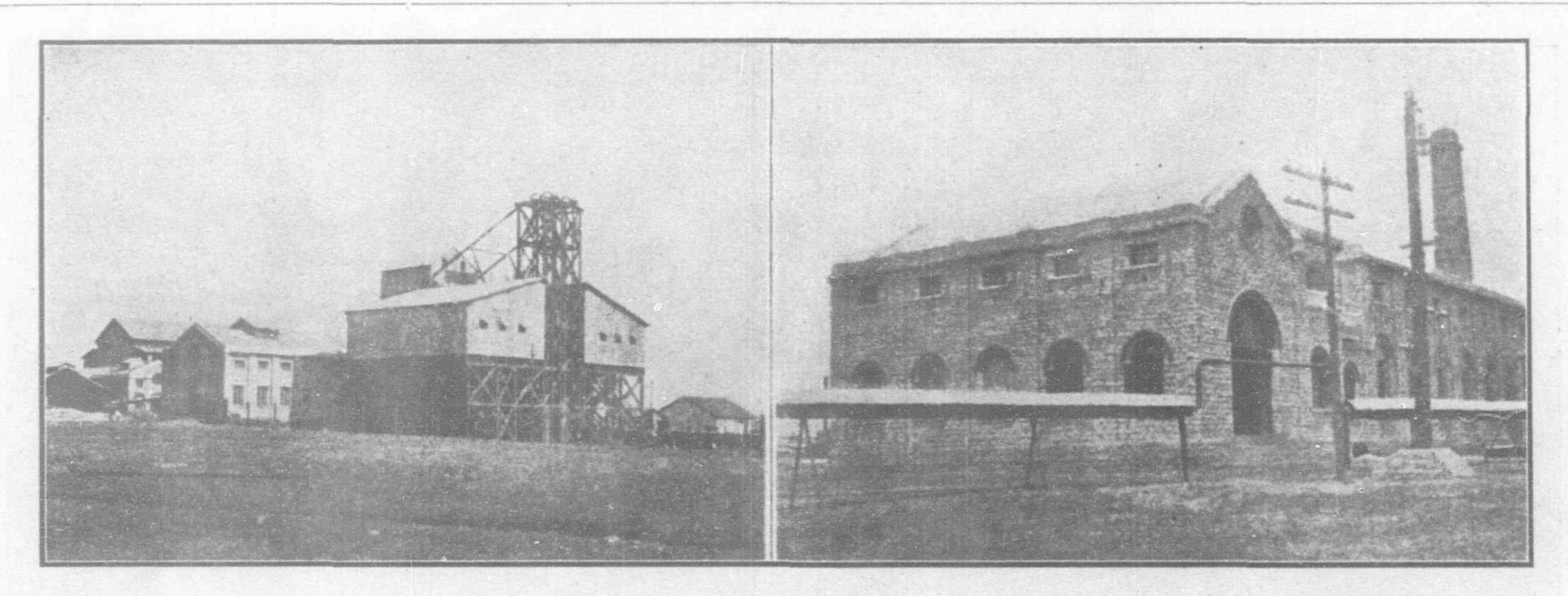
Owing to the increased demand for electric power at the mines, a third transmission line may ultimately be constructed from Sivasamudram to Kolar to supply at least







NATIVE STREET IN BANGALORE TO BE SUPPLIED WITH ELECTRIC LIGHTS



MOTOR-OPERATED ROCK-CHUSHER AND COMPRESSOR HOUSE CONTAINING 900-H. P. MOTOR-DRIVEN WALKER AIR COMPRESSOR, CHAMPION REEF GOLD MINE, KOLAR GOLD FIELDS

an additional 2,000 h. p. For this purpose an extra 2,000-kw. unit will be installed in the present generating station at Sivasamudram.

It is probable that a 6-m. line will be constructed from the Kolar transformer station to Betmangala, where is located a 450-h. p. pumping station, which is the main source of water supply for the Kolar gold fields. The three 150-h. p. Worthington pumps are at present steam-driven.

A 1,000-h. p. steam plant has recently been built, and put into operation, for the supply of light and a small amount of power to the gold mines. The equipment consists of four 250-h. p. Allen condensing engines direct-connected to a 175-kw. British Westinghouse generator. Two of the steam-driven sets consist of two generators, one of 50 cycles for lights and one of 25 cycles for power, mounted on the same shaft with a 250-h. p. Allen engine.

The steam plant is quite up-to-date, embodying two batteries each of two Babcock & Wilcox 300-h. p. water-tube boilers equipped with feed-water heaters, a Green economizer, chemical softener and superheaters. Forced chimney draft is used to secure complete combustion. A cooling tower equipped with motor-driven cooling fans is located near the station.

All outgoing feeders are led underground from the switchboard about 100' distant where is located a distribution tower (see illustration) from which they are carried in four directions over the gold fields.

BANGALORE LIGHT AND POWER DISTRIBU-TION.—Distribution of light and power for the City of Bangalore is to be effected from one main transformer station and two smaller substations located near their respective centers of distribution. The two additional substations are necessary owing to the extent of territory to be lighted.

The transmission line voltage is stepped down from approximately 31,500 volts, as received after 10 per cent loss in transmission, to 2,300 volts by means of six 150-kw., 25 cycle General Electric oil-cooled transformers; 2,300-volt feeder mains are run from the main transformer station to the other two substations.

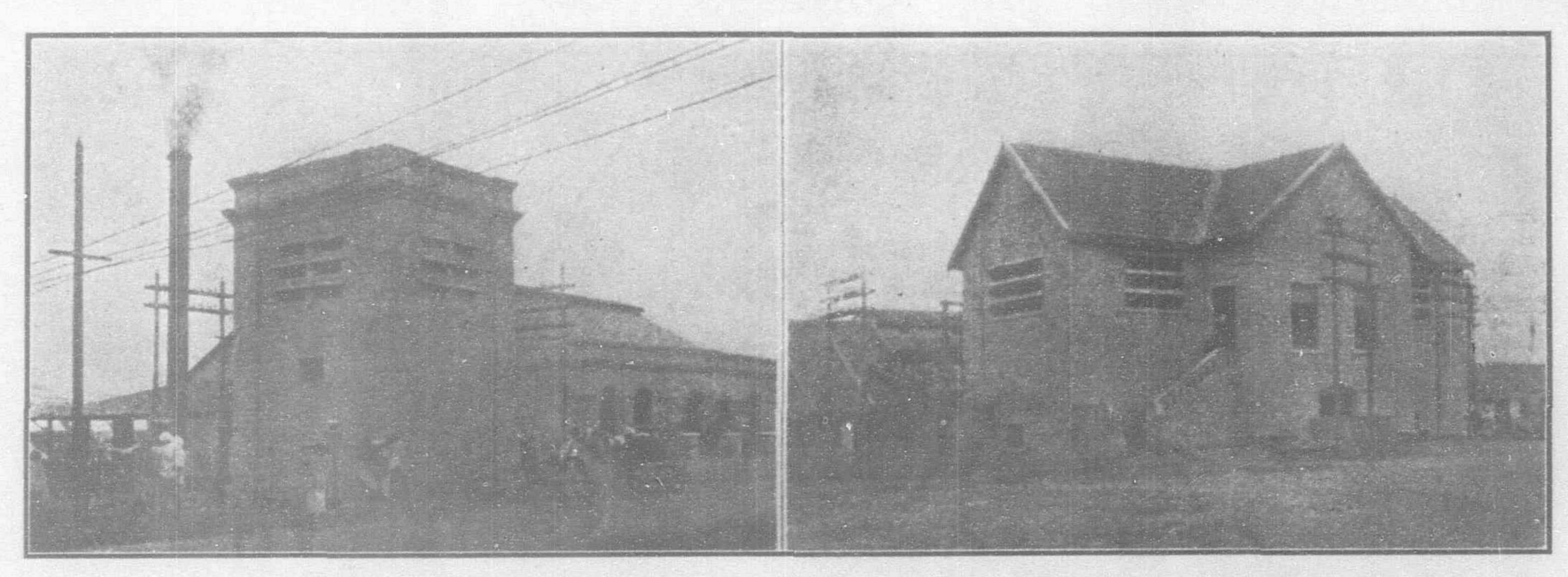
In each of the substations there will be installed constant-current transformers with a primary voltage 2,200 and a secondary voltage at full load of 3,000. Each tranformer has a capacity of 17.5 kws., or approximately 104 40-candle-power series incandescent street lamps. The latter are placed on iron poles with goose-neck fixtures. The spacing is 300' between lamps in all of the principal streets, with a gradual increased spacing towards the outskirts of the city. Also in each substation there will be installed a 110-h. p., 75-kw., 720-r. p. m. motor-generator set, or frequency changer, in addition to necessary feed regulators, panels, switches, meters and fuses for general interior lighting and for power distribution. A frequency of 25 cycles is used for the street lighting and power circuits, while 60 cycles are obtained by the frequency changers for interior lighting. The distribution for interior lighting is effected by 2,200volt feeders radiating to local centers, where are installed lighting transformers for a 3-wire distribution at 440/220 volts. A 2,200-volt feeder leads to the center of power distribution, where the voltage is lowered by transformers to 230 volts for the operation of 3-phase induction motors.

About 500 h. p. will be consumed by the Bangalore cotton and woolen mills and it is expected that at the least 500 h. p. will be consumed for lighting at the start. The lighting load is expected to increase to a great extent. With the day load of motors and the night lighting load somewhat equally divided, a high load-factor should result.

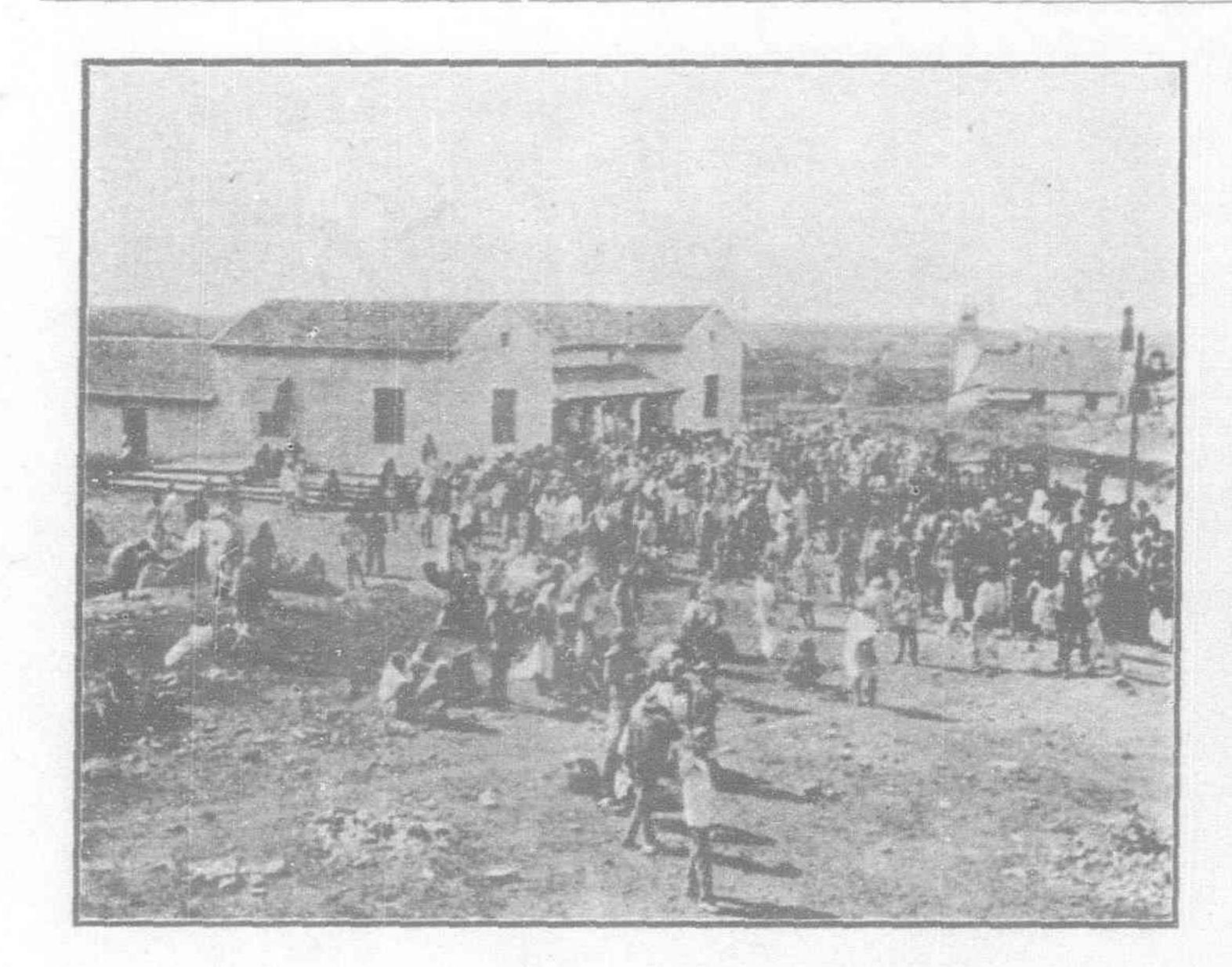
Many Difficulties Encountered in installing a lighting system in a city like Bangalore, where the local centers of distribution are so far apart. The carrying out of the plans for the street lighting circuits has been very difficult, especially in the native quarters and bazárs, where the streets are narrow and crooked and the houses are staggered in such a manner as to make the construction of pole lines very difficult.

The low rates charged for lighting afford Bangalore cheaper electric illumination than will be found in the majority of English, Continental, and American cities, and it is evident that the residents intend to take advantage of this opportunity. Owing to the grade of material installed and attendant inspection by competent and experienced electricians, the fire risk is practically nil as compared with oil lamps, and fire insurance rates should be lessened. The entire cost of installation of light and power in the city is estimated at 6 lakhs (£40,000) of rupees.

Owing to the fact that it has been found necessary to obtain special sanction, under the Indian Electricity Act, from the Government of India, for the supply of light and power to that section of the Bangalore



STEAM-POWER STATION, SHOWING ALSO THE DISTRIBUTION TOWER, AND THE CHAMPION REEF AND MYSORE SUBSTATION, KOLAR GOLD FIELDS





PAY DAY AT ONE OF THE MANY MINES, KOLAR GOLD FIELDS

OOREGAUM OLD STAMP MILLS; THESE HAVE BEEN REPLACED BY A
MODERN STAMP MILL

Municipality known as the cantonment, the plans as briefly outlined above have had to undergo many changes. This has necessitated much delay and additional first cost to the Mysore Government of the installation as a whole.

As the two smaller substations, for supplying light and power, are located within the precincts of the military station, or cantonment, it has been necessary to make arrangements for the time being to supply the city proper from the main step-down transformer station, thus overcrowding it to a considerable extent. It seems obvious that some provision might have been made by those in authority, whereby such unnecessary delay and increased outlay might have been avoided, and the cost of illumination maintained at the original unusual low rate.

It is highly probable that the City of Mysore, the seat of government of Mysore State, will be supplied with light and power over a separate 40-m. transmission line from

Owing to the rapid development and expansion of electrical projects in Mysore State it has been necessary to establish an electrical branch of the Public Works Department, with the head office of the same at Bangalore. Mr. H. P. Gibbs has held for the past 3 yrs. the office of chief electrical engineer to the Government of Mysore. To Mr. Gibbs and other engineers on the staff of the Cauvery power scheme, the writer is indebted for many valuable suggestions

and much valuable assistance pertaining to data regarding the scheme.

Mysore has the proud distinction of having, in the development of the Cauvery Falls power scheme, paved the way for future progress of like projects in other provinces of India. Chief among those whose efforts made possible the ultimate success of the Cauvery project were Major A. J. de Lotbiniere, R. E., deputy chief engineer to the Government of Mysore, and Sir K. Sheshadri Iyer, the late Dewan of Mysore, whose death before the completion of the work is to be deeply regretted.

Since the completion of the Cauvery power scheme, electric development in many respects has shown a marked progress all over India. Several hydro-electric projects are in a fair way to be realized in the near future. At the present the most important piece of electrical engineering work for which plans are being prepared is the Kashmir or Jhelum River power scheme in N. India. This will, in all probability, include a 15,000-h. p. installation for light and power, a large electric dredging system and a 200-m., single-phase electric railway. Several large cities are already installing or preparing to install municipal lighting plants.

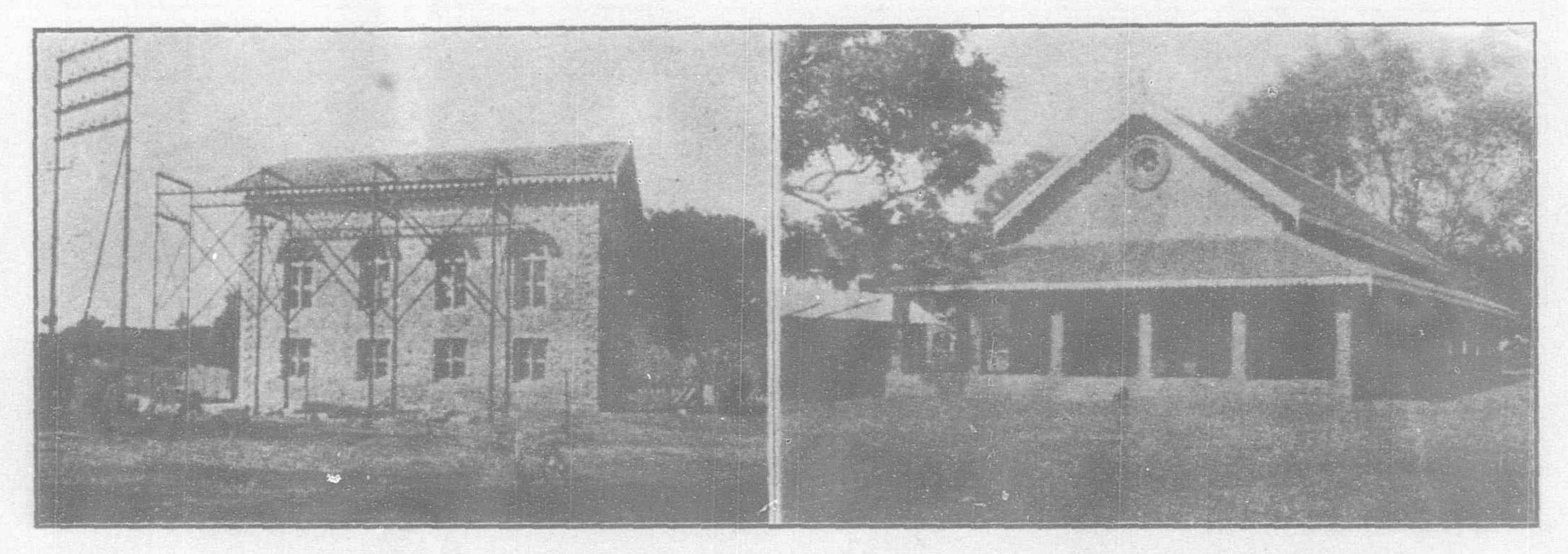
Several parts of India are rich in iron, aluminum, and other mineral deposits, but owing to the high price of fuel and transportation difficulties these deposits remain undeveloped. The location of a water power within economical transmission distance affords

the only available means of making these deposits a paying mining investment. Thus it is highly probable that the electric furnace may play an important part in the development of the steel and aluminum industries in India.

(Concluded)

JAPAN'S GROWING TRADE

Despite the serious interference caused by the war, the foreign trade of Japan for the year 1905 reached an unprecedented volume, the total amounting to over \$400,000,000 against only \$345,000,000 for the previous year, while a comparison made with 10 yrs. back shows that the trade has nearly trebled during the decade, the growth having been quite startling in its rapidity. The Anglo-Japanese-Gazette says that each year indicates that Japan's future lies in her manufactures. The results of the past two years were attained in the face of almost overwhelming difficulties, nearly 1,000,000 of able-bodied men being absent on the battlefield, and yet, in spite of this, and the fact that the people of Japan had to furnish supplies for the army and navy, they were able to send larger quantities of manufactured goods abroad. The exports kept up their rate of steady progression, although naturally enough, when compared with the imports, this development appeared to be comparatively trifling. Now that peace has, been established on a solid footing, it is reasonable to expect a further expansion of Japan's foreign trade, although the shortage



DISTRIBUTION SIDE OF MAIN TRANSFORMER STATION, AND OFFICE OF THE CHIEF ELECTRICAL ENGINEER TO THE MYSORE GOVERNMENT, AT BANGALORE

of the rice crop in the northern districts is a severe handicap. It is estimated that this is the worst famine known in Japan for 60 yzs., and the conditions in NE. Japan were worse during the opening months of this year than at any time during the 2 yrs. of war. In the three provinces hardest hit there is said to be a loss of nearly \$15,000,000 on the rice crops, the average yield this year not having reached one-quarter of the usual amount. Apart from the rice harvest, however, the commercial outlook in the country appears to be decidedly encouraging.

Consul Sharp furnishes the foreign trade returns of the ports of Kobé and Osaka for the calendar year 1905. He writes from the former city as follows:-Customs statistics for last year show the trade of Kobé to have reached the high record of \$156,536,000 gold. The imports have been increasing since 1901 at the rate of \$5,000,000 to \$10,000,000 a year, but in 1905 they bounded forward by \$26,879,000 over the previous year, the aggregate amounting to \$114,307,000. The most important increases in imports last year were raw cotton, \$13,417,600; woolen cloth, \$1,710,800; oil cake, \$1,404,800, and metal and metal goods, in which is included an increase of \$3,677,800, in machinery. The only marked decline was in rice, which fell off \$5,495,000, blankets \$1,356,000 and kerosene oil, which was \$1,756,800 less.

The exports of Kobé for 1905 totaled \$42,229,000, or a decrease of \$1,758,000 as compared with the previous year. The losses
covered practically the whole trade, very few of
the more important staples showing an increase.

The trade of Osaka, adjoining Kobé, continues to increase enormously, having jumped from \$23,883,000 in 1904 to \$37,219,000 in 1905. The bulk of the trade of the port is with North China and Korea. The imports figured at \$9,249,000 and the exports at \$27,969,000. The \$12,573,900 increase in exports was chiefly in copper (including copper disks for coins), cotton yarn, cotton piece goods, and saké.

AMERICAN MACHINERY IN FOREIGN COUNTRIES

It is interesting to note the industrial development now taking place in countries whose civilization began centuries before that of the western world. The rapid assimilation of electrical machinery in those countries is particularly remarkable, and a glance at the orders received in America for such apparatus not only brings out this point, but also indicates the diversity of these enterprises. Japan is representative in this regard. Within a comparatively few years this empire has advanced rapidly in many phases of modern engineering. In the field of electric lighting Japan is well advanced, particularly in the matter of equipment. The Nagoya Electric Lighting Company is about to install its second 500-kw. Curtis steam turbine for this purpose. The additional equipment includes also a 9-panel switchboard and a small 25-kw. horizontal Curtis turbo-exciter set made by the General Electric Company. The last mentioned machine indicates how closely Japanese engineers follow American practice even in details.

Another country, old in civilization, is adopting American electrical apparatus for power, lighting and railway work. Note has already been made in these columns of the electrical transmission plans for the Kashmir Valley and another order from India illustrates a different line of work. The Rangoon Trams of Rangoon, Burma, have purchased 25 General Electric 80 (40-h. p.), 2-motor railway equipments for

service on their systems.

In the western hemisphere Mexico represents a civilization perhaps as old as that of the Japanese, and here again is found the same awakening in industrial enterprises. Mexico is rapidly coming to the front ranks of the commercial army, both in agriculture and mining development. Many mining properties are being extended and electricity is one of the chief factors. In this connection the American Smelting and Securities Company has ordered power-house equipment for its Velardena Mines. This apparatus includes two General Electric 450-kw., 3-phase revolving

field generators complete with switchboards and exciters. Electricity from the famous Necaxa Falls power development will be used in Mexico City for lighting, power and railway purposes. The railway lines are operated by the Mexico Electric Tramways, Ltd., and this company will also use machinery and railway apparatus built in the United States. The entire equipment for the railway will be furnished by the General Electric Company of New York, and will consist of four complete sub-station equipments, generator sets, exciter sets, and complete switchboards for each sub-station. The cars will be operated by General Electric 2-motor and 4-motor equipments in addition to many which are in service.

GOLD IN SIAM

The mineral development of Siam, says The Bangkok Times, is a subject that is coming prominently before the world recently, and much that is of interest to mining engineers and prospectors, who have been laboring to bring to the surface the hidden mineral wealth of the kingdom, has been related. Without being compared to the gold producing countries of California, Australia, or even Brazil, we may point out that Siam, as early as 1850 held a good rank with such countries as Peru and Argentine; because after the statistics of the celebrated chemist Pelouse, Siam figured at that epoch in the world's production of gold as contributing annually about 500 kilogrammes. For a long time the methods of extracting the precious metal were little improved, and nearly 20 yrs. passed away before societies were formed with a view to a proper exploitation of the gold fields of Siam and the working of their resources. We have, however, to accept the fact that the results of the working of those societies have not justified the hopes of the shareholders, and they dwindled away one by one after sacrificing considerable capital. Long years of financial vexation are not, however, sufficient reason to conclude that Siam is not rich in gold. The studious and diligent work achieved by men of energy and perseverance proves the contrary. In the course of explorations, numerous indications of the presence of gold were obtained and many beds were discovered and marked out. Under such conditions there is no reason why new mining societies could not successfully participate in the development of the rich mineral resources of the soil of Siam for their own interest, as well as the prosperity of the country.

In following such enterprise, they must work prudently, and avoid the road followed by the older societies, whose failure must not be attributed to the poverty of the gold bearing vein, but rather to a deplorable administration. They were under enormous general expenses, and lacking in centralisation of authority, to which was added carelessness and incompetency of staff. Remoteness from central direction was also a great drawback, as well as slowness in means of communication, both in news and transmission of orders. Such were the difficulties against which former mining societies had to contend; but those difficulties would have been with more prudence and patience surmounted. Such experience will not be lost on the Syndicate formed recently for the exploitation of the Sisophone Gold Mines under the title: "Sisophone Gold Mining Syndicate."

This syndicate has been created in Bangkok by persons having a thorough knowledge of the country and its resources, and who mean to carry on the work in a systematic businesslike way, which is bound to insure success and beneficial results.

The mine which this syndicate purposes to exploit is situate northeast of Sisophone in the region of the forest in a place which is quite healthy. It is drained by the rivers of Sisophone and of Bak-Prea, the first flowing from the mountains of Chantaboon on to Battambong, and the second from Khao-Kampeng in the Korat chain flows into the Toule'-Sap at Bak Prea, beyond 20 kilometers of the mine. These two rivers are navigable for a good part of the year, and on this account afford excellent facility for trans-

portation. Besides manual labor is plentiful. The coolies are Cambodians and can easily be had. Should the number prove insufficient, Laotians can be had in great numbers, as they acclimatize and adapt themselves to any country very easily and come from various points of Laos, viz: Onbon, or Tran-Ninh, and from Song Khone and Chieng Mai. They are good workmen and soon learn the art of mining and are easy to direct. Though they are addicted to gambling and sometimes inclined to be idle, they are docile, and these faults can be easily checked, under strict supervision; and payment must be made partly in order to secure, in any case, the daily meal.

The gold mine concession of Sisophone, embraces six veins, which are already recognized, each having a length of more than 300 meters and 40 meters in depth. The thickness of these veins vary from 1 to 451. The visible gold is found especially in the

crossing of sundry veins.

Being well acquainted with the administrative competence and technical knowledge and experience of the founders of the Sisophone Mining Syndicate we are sanguine of the great prosperity that awaits this new enterprise which already insures brilliant results.

Siam being possessed of such rich mineral resources at various points, it is a matter for some astonishment to see small and big capitalists still awaiting opportunities to invest and float industries of this kind, which, if well directed, would prove much more lucrative than the highest interest on bank deposits.

WHIRLWIND IN SHUNTAK, CHINA

At Wang Po, in the Shuntak District, according to the Canton Times; a very destructive whirlwind has occurred, which reminds some of the like calamity which befel Canton in 1880. This local cyclone swept over the district named on the 22nd of last Chinese month. It burst forth shortly after noon. The heavens became suddenly dark as pitch. Then amidst a blaze of lightning and a terrific roll of thunder, the storm wind went forth to work its will on man and beast, on house and tree. The first town struck was Kwan Miu and therein were overturned more than a hundred buildings, comprising matsheds, brick houses, and temples. More than 100 people were seriously injured, and in addition between 30 and 40 killed. The cyclone then struck Hoi Pin, which it levelled in the same way, and killed 14 persons. Many more were also injured. The whole thing was very sudden and unexpected. The report speaks of feur large places which suffered most, though no doubt other villages and hamlets were injured in the same way. Of all the places struck, however, that which has called forth most sympathy is the town Kwan Min, and for this reason:-Not very long ago this market town was attacked by brigands, who destroyed and burnt to the ground more than 1,000 houses. Since then the inhabitants have been exerting themselves in order to rebuild their houses and repair that calamity. Many of the houses have been rebuilt, and now this second calamity, even greater, has come upon the people, and they are in despair. The various societies of the local Shin Tongs, which were outside the course of the circular storm, at once bestirred themselves to assist some of the sufferers. But the funds which they were able to subscribe were just enough to find medicine for those who were injured. They have therefore appealed to the chamber of commerce in Canton for immediate assistance. The chamber at once called together the hands of the Nine Shin Tongs in Canton to hear the report. This was sombre enough. In addition to this particular damage, the incessant rains have destroyed the mulberry trees, killed the silkworms, washed away the paddy, and left absolutely nothing for the people to eat and nowhere on which they can lay their heads. The Shin Tongs immediately voted \$600 (!) which is to be sent at once, and afterwards something further will be sent to assist the sufferers.

IMPROVEMENT AND EXTENSION OF THE CITY OF ZAMBOANGA

(From our Special Moro Edition.)

Plans for the improvement and extension of the City of Zamboanga, Moro Province, P. I., prepared by Mr. W. E. Parsons, consulting

advantage of facing the sea, with no obstructions to view or air.

With the prospect of a rapid growth in size and importance, it became evident to the

retail business, (3) a desirable section for residences, (4) a convenient system for streets, and (5) public parks for recreation and amusement.

The location of the new provincial building determines definitely the civic center. This becomes the heart of the city, from which the

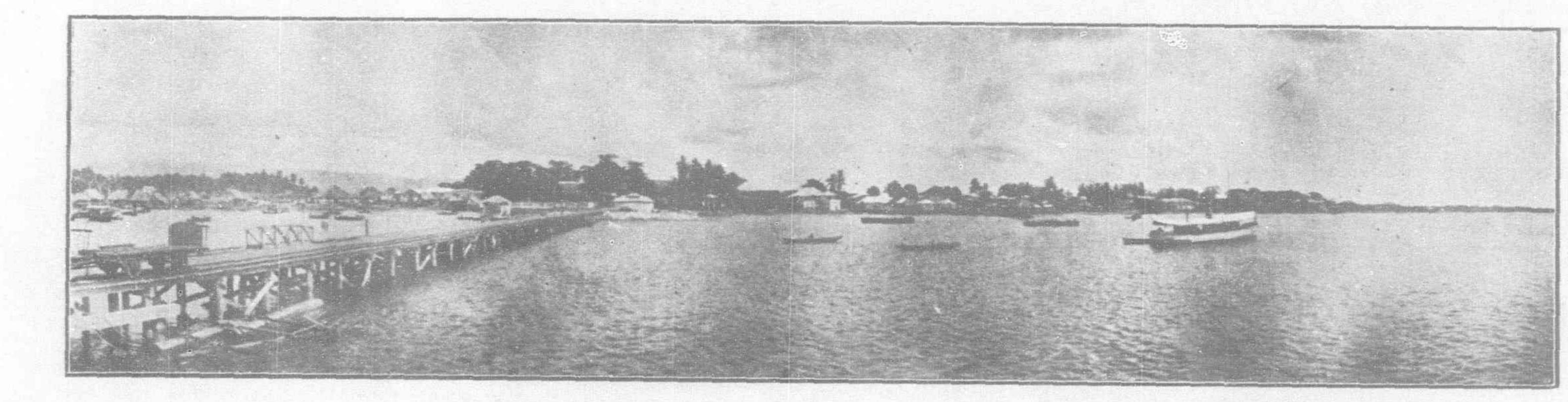


Photo by Encinas, Zamboanga.

CITY OF ZAMBOANGA, LOOKING NORTH FROM THE PIER

architect to the Philippine Commission, have recently been adopted by the Legislative Council of the province, and all future public works of the municipality will be conducted to conform therewith.

Zamboanga, established as a military post by the Spanish in the XVIITH Century, was maintained by them for this purpose until the American occupation in 1901. Commercially it was until recently of no more than local importance.

ATTRACTIVELY SITUATED.—As a military post the town was attractively situated and well arranged. The parade grounds, barracks, officers' quarters, in fact the entire town, had the

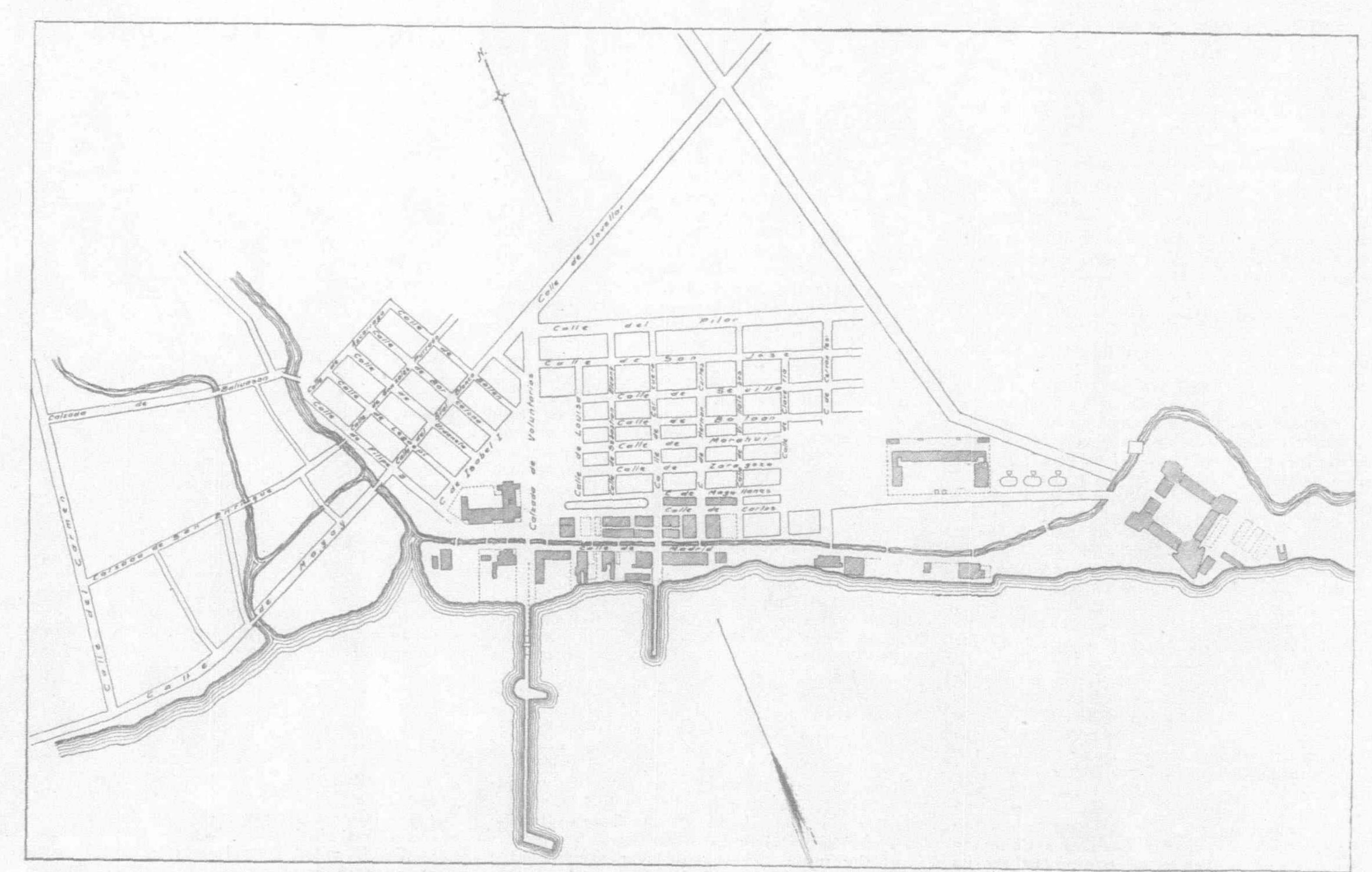
government that the area suitable for commercial purposes and for residences would be insufficient in the near future. The situation of the town is peculiar in this respect. It is shut off from natural expansion on three sides—by the sea on the S., and by marshes and low land on the E. and S. On the W. alone is there opportunity of natural expansion. These conditions, together with the location of existing buildings of a permanent character, form the basis of the adopted scheme for future development.

Purpose of the Plan—The purpose of the plan is to provide (1) provincial and other public buildings, (2) an area for wholesale and

principal arteries of communication radiate. For this purpose the irregular space N. of the provincial building adjoining the church is given a definite semi-circular form.

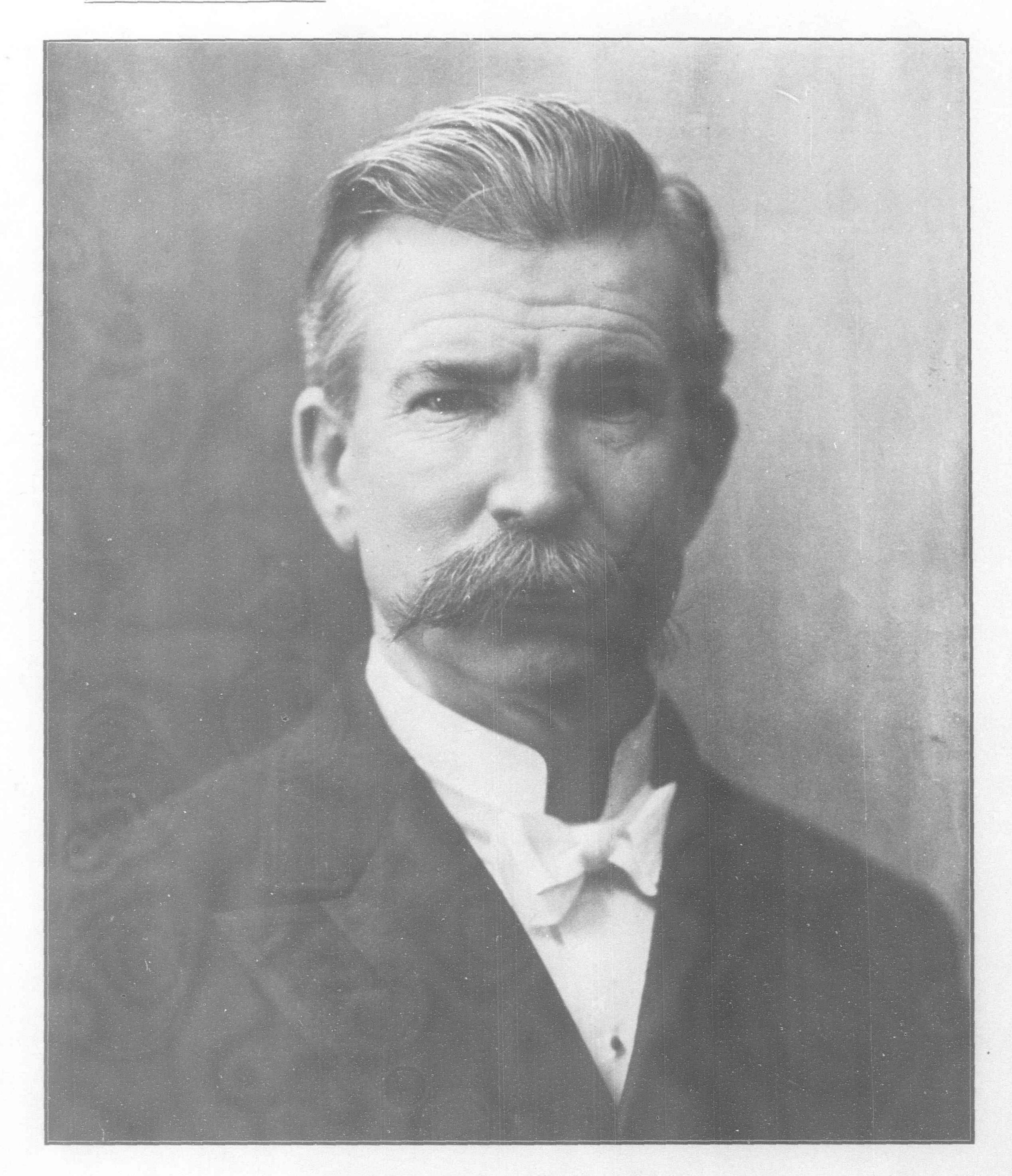
The building for the provincial government will be extended as future needs may require towards the sea, with the principal facade on the waterfront. Such an extension will a little more than double its present capacity.

Placed symmetrically with this building on the opposite side of Calle Voluntarios, which is 100' wide at this point, will be the custom house. This may be built in sections as required to provide for increasing business. The ground floor will be used for storage and



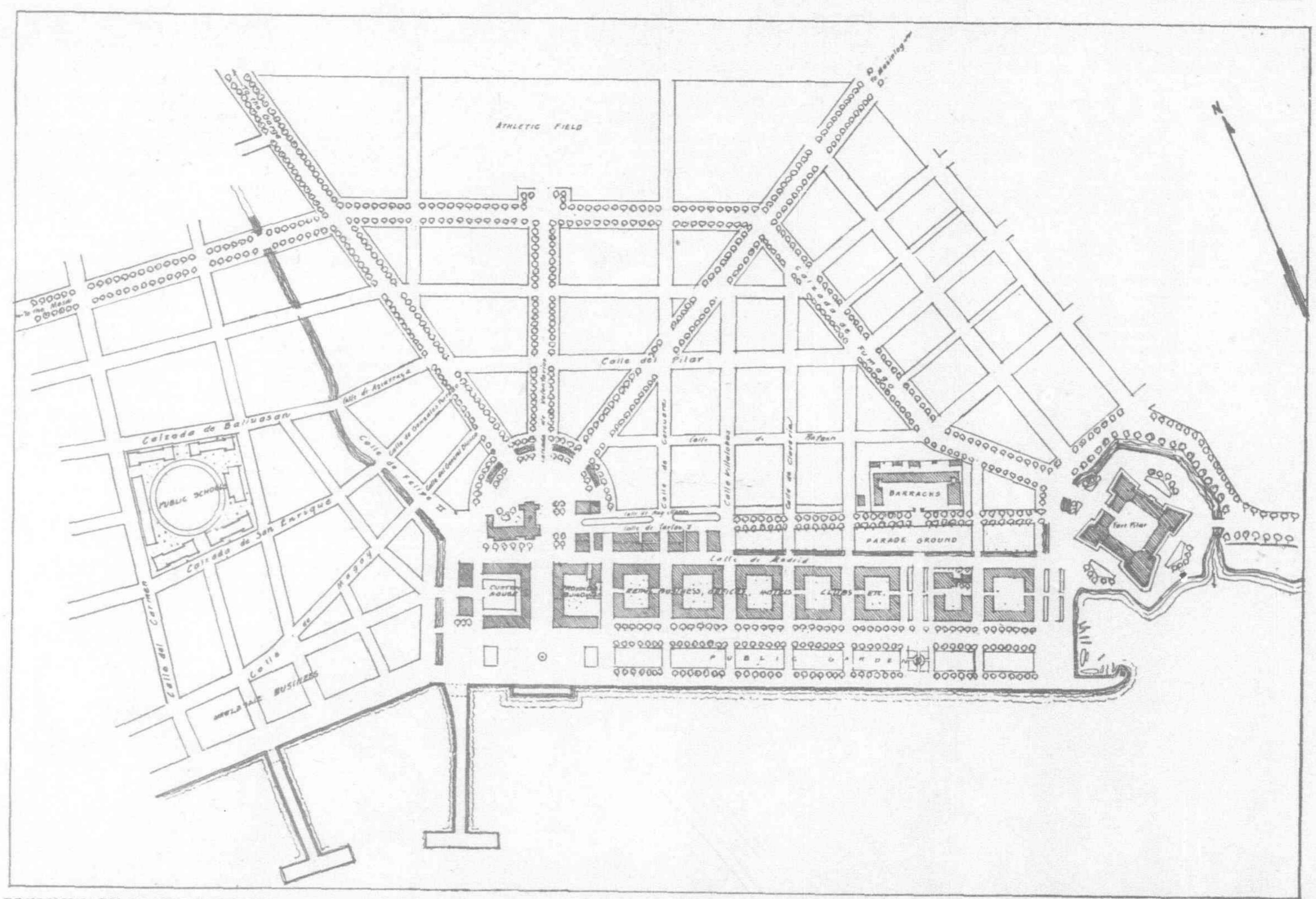
PRESENT SITE OF THE CITY OF ZAMBOANGA, CAPITAL OF THE MORO PROVINCE

June, Nineteen Hundred and Six



Cis Excellency Cuke E. Wright

First American Ambassador Extraordinary and Plenipotentiary to the Court of His Imperial Iapanese Majesty at Tokyo



PRELIMINARY PLAN OF PROPOSED IMPROVEMENTS IN ZAMBOANGA, PREPARED BY MR. W. E. PARSONS, CONSULTING ARCHITECT TO THE PHILIPPINE COM-MISSION, AND RECENTLY ADOPTED BY THE LEGISLATIVE COUNCIL OF THE PROVINCE; NOTE THE UNIQUE ARRANGEMENT OF THE PUBLIC SCHOOLS

the general handling of merchandise; the second floor will contain offices; the space in the court and that extending towards the river may be used for *i*-story bodegas.

The public schools are located on the site bounded by Calle de Carmen, Calle San Enrique, Calzada de Guzu, and a new street. This site, admirably suited to its purpose on account of its central location and sanitary condition, has already been acquired. The school buildings are arranged in the form of a quadrilateral, being on or parallel to the street lines, and leaving a large court in the center to be used as a play ground. Part of the grounds is well shaded.

Business Section.—In a modern city of commercial importance, the business section should, according to expert builders, be compact, in order that merchandise may be handled at a minimum cost and loss of time. In the case of a seaport it should adjoin the docks and be conveniently near the custom house. Moreover, in a growing town there must be room for the expansion, both of the building area and of the docks.

The section best suited for this purpose at Zamboanga is the site of the present Moro Village, where a considerable amount of business is now transacted. In this section, alone, is there room for unlimited expansion. Mr. Parsons recommends that the temporary pier be replaced by a permanent one on a line about 300' W. of its present position. This location has the advantage of being near the future custom house and shipping center. Moreover, the development of the civic center as a monumental feature requires an unobstructed view of the sea at this point, while the removal of the noise and dust incident to traffic will be an advantage.

In connection with building for retail business, are considered offices for general business and

professional purposes, hotels, apartments, and club houses. Additional area is provided for these by reclaiming from the sea a strip of land about 420' in width. By this means blocks of about 250' × 300' are obtained giving an opportunity for buildings with an exposure both to the sea and on Calle Madrid and the parade grounds. The open courts, around which the buildings are built, may be treated in a variety of ways according to the purposes of the building. On the waterfront the buildings will be preceded by an open space 200' in width used as a public garden, with roadways, paths and grass plots to diminish the reflection of heat and glare of light. A few trees will be planted here, but not enough to obstruct the view.

Land thus reclaimed at a comparatively small cost becomes public property and will be leased by the government to individuals for a long term of years, affording a considerable public revenue. The cost at Manila of reclaiming ground by means of the hydraulic dredge Manila, owned and operated by the Atlantic, Gulf and Pacific Company, Inc., of New York and Manila, is 22 centavos (11c gold) per cubic meter. At this rate, if the average depth to be filled at Zamboanga is 3 meters, the cost, once the riprap bulkhead has been constructed, will be 66 centavos (33c gold) per square meter of land. Provision will be made in the land leases for the erection of buildings of a proper construction and character, assuring in this way an impression of architectural unity. Such a group of buildings along the waterfront with the public buildings of a monumental character at one end and the Spanish Fort del Pilar at the other, together with the tropical foliage of the public gardens, will give the city an imposing and quite unique appearance. An effort in this direction will be well invested as an advertisement in view of the fact that

the city is seen from many ships passing through the Basilan Straits.

Sections for Residences.—The section suitable for residences is quite restricted in area, only that on or near the waterfront being really desirable. To the E. of Fort del Pilar is only a narrow strip of good land, and that will probably be required for military purposes. The ground on the N. is, in its present condition, undesirable for dwellings.

In these circumstances Zamboanga is especially fortunate in having within 3 or 4 ms. such attractive building sites as are offered on the foothills and mountain slopes towards the N. To give this section direct and easy access, the plan provides an avenue 130' in width leading in a straight line from the center of the city to the gorge. With an unbroken line of shade trees on either side, and with the dome-shaped hilltop at the end of the vista, this avenue will be a feature of exceptional beauty as well as utility. For a part of the distance it will lead nearly parallel to the river The intervening space of about 100 yds. may form a part of the park system, through which may pass the electric railroad when required.

This section will be set aside as a reservation and with the aid of a topographical map receive careful study with a view to establishing a system of connecting drives of gentle grade. Such drives will be laid out at first at small expense as trails or 5' wagon roads, but will be on the final location of the future drives. Roads of steeper grade, when necessary, will lead to the desirable building sites. The gorge itself, with an encircling drive so that a view from all points may be afforded, will be preserved as a part of the park system and preserved in its present beauty. The surrounding hillsides will be dotted with villas and bungalows. The mesa, E. of Zamboanga, will also offer excellent sites for residences.

System of Streets.—The system of streets shown on the plan provides communication along the waterfront and in three lines converging to the public plaza in the center of the city. One of these avenues leads directly to the gorge as described above, another to Masinlog. There is also a broad avenue forming practically the perimeter of the present town site and intersecting the radiating avenues. These avenues are expected to accommodate the through traffic and to be the location for electric roads that may be constructed. The areas between these avenues are divided into rectangles by streets of convenient width. In this sense the present system is preserved, with the criticism, however, that the streets as at present located are too near together and the plots too small. Plots of the size shown on the plan will afford building lots of more suitable size; at the same time the number of streets is diminished, and consequently the cost of maintenance.

In the outlying sections occupied by the native population it is recommended that building laws prohibit the erection or repairing of dwellings nearer the street than at prescribed distance. As the nipa huts are temporary structures of short life, the streets may be gradually widened. Where houses are of such

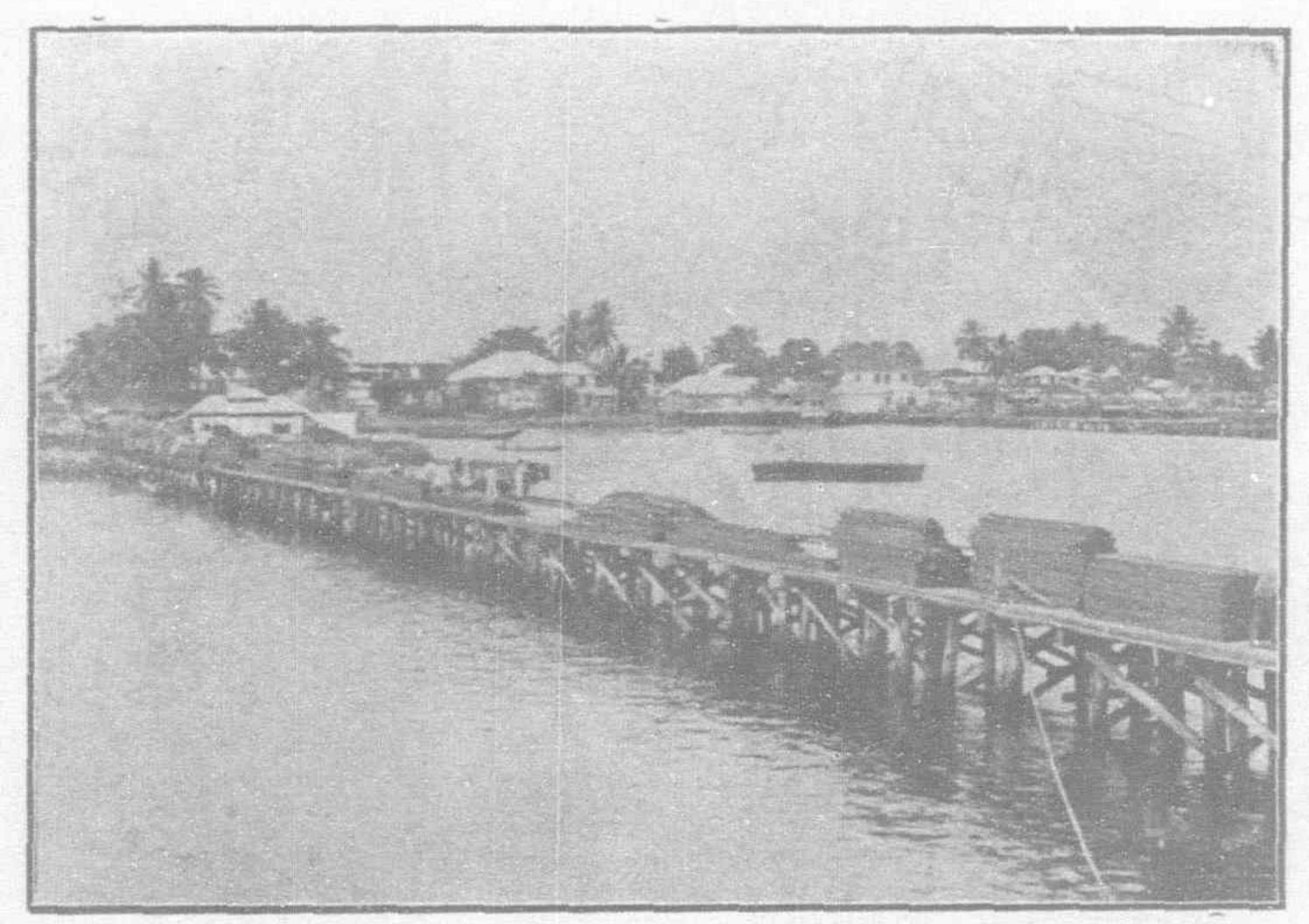
Madrid where additional road way will be required, the water may pass underground, reappearing along the edge of the parade ground. If the banks are made somewhat steeper and well sodded with grass, this canal can be kept in sanitary condition. By making its outlet into the sea just beyond the fort its course is shortened and its current consequently made more rapid.

The use of trees for shade seems to have been quite ignored by the natives and except in a few cases by the Spanish. To Americans it seems that in a tropical climate well-shaded avenues are almost a necessity while esthetically the opportunity for luxurious tropical foliage of contrasting shades and colors is one not to be neglected. A difficulty for which provision has been made, is that of obtaining young trees in sufficient quantities for transplanting. A nursery for the cultivation of these young trees will be established immediately.

METHODS OF CONSTRUCTION.—The first essential in good architecture is the adaptability to climatic and other local conditions. The Spanish builders felt instinctively the truth of this, and after an experience of three centuries have produced in the Philippine Islands an architectural style both beautiful and practical. The most successful builders depend

During the fishing season, which lasts from the end of March to the end of November, a lookout is kept at all hours of the day and night, from stations on shore and from boats at sea, for the shoals of herring and other fish which form the raw material from which the manure and oil are obtained. After the fish are captured and the nets hauled up on the beach the fish are thrown into inclosures alongside of a number of iron try pots, which are about 41/2' in diameter and 21/2' deep and erected on brick fireplaces, and in these the fish are first boiled. After boiling they are put into wooden presses about 3' square and 21/2' deep, the sides and bottom of which are composed of slats having a small opening between them. The cover is put on and pressure is then exerted on top by means of levers or stones put on top of the cover, the oil and water pressed from the fish running into a tank, where the water, going to the bottom, is first drawn off and the oil afterwards put into old kerosene cans, soldered up, and is then ready for shipment. The fish, after being pressed, is in the shape of a hard sodden mass, and this is removed from the press, broken into small pieces, and spread out on mats in the sun and dried. When dry it is packed in straw mats and shipped. It is estimated that not more





ZAMBOANGA PIER AND ANCHORAGE FROM THE MORO QUARTER, AND A CLOSER VIEW OF THE PIER

inflammable material it is important that they be separated at intervals by wide streets, in order that conflagrations may be confined to comparatively small areas.

In the preparation of this plan, effort has been made to avoid the condemnation of any valuable improved property. The rearrangement of some of the streets N. of the center will require a readjustment of properties, but since most of the buildings in this section are of nipa it is thought that the desired changes may be made without great expense.

Public Parks for Recreation and Amusement.—Until a few years ago the parade grounds were well suited for this purpose, but the buildings erected along the shore now obstruct the air and view of the sea. The public gardens along the quai on the area to be reclaimed are intended to restore this attractive feature of the old town. The gardens will be adorned with tropical plants, and provided with a bandstand, seats, and every provision for comfort.

The grounds surrounding Fort del Pilar unless necessary for military purposes, will be included in the park system, provision being made for the laying out of grass plots and planting of shade trees, arranged in the form of the outlying bastions which usually surround such fortifications.

In this connection may be considered the canal. Constructed originally as a water supply, this palm-shaded, many-bridged canal has become the most picturesque feature of the town, and will, if possible, be preserved on this account. Through that part of Calle

for their effect more on their beautiful proportions, their simple wall surfaces and tile roofs, rather than on decorations and the use of expensive materials. It is expected by Mr. Parsons that the modern use of concrete, strengthened by steel rods to resist the tensile stress caused by earthquakes, will prove to be a more economical and durable method of construction than the use of timbers. Mr. Parsons says the use of galvanized iron for roofs in place of tile is to be regretted. Tile roofs are better adapted to resist the heat than iron and are in the long run more durable and economical.

Such a plan for the development and expansion of Zamboanga as the one presented is based on future rather than present requirements. It is not expected that such improvements will be made at once, but will progress step by step over a long period of years. By keeping pace with the development of the Moro Province, along a definite and well-defined plan, Zamboanga has the opportunity of becoming an important city of convenient arrangement and unusual beauty. This is the view expressed by Mr. Parsons and enthusiastically concurred in by the progressive members of the Legislative Council.

JAPANESE FISHING INDUSTRY

Edward Julian King, American consular agent at Hakodate, reports on the manufacture of fish oil and fish manure in his consular district, where he thinks American machinery for such purposes can be sold to good advantage. He writes:— than 60 per cent of the oil is extracted from the fish, while in drying the manure, more than half of the phosphates, the most valuable part, are lost by evaporation and from escaping into the ground. The oil is nearly all exported to Holland and England, but the manure is all used in Japan, and the amount annually produced is not sufficient to supply the demand. In view of these conditions, American citizens can benefit in two ways, as follows:—

First. By the introduction and the sale of American machinery, such as hydraulic presses of the kind used by the fish-manure manufacturers on the Atlantic coast. The machine that would sell best should be light and portable so as to enable it to be shifted from station to station.

Second. By the erection of fishing stations on the Pacific Coast, especially in Southeastern Alaska, and in exporting the fish manure to this country. The offal in all the large salmon canneries, such as heads, entrails, etc., will also work up into manure.

The price of fish manure in Japan is from \$40 to \$75 United States gold per ton, according to the supply. At present the price in Hakodate is from \$58 to \$63 per ton of 2,240 lbs., according to the quality. There is no import duty, and intending exporters can therefore easily figure the margin of profit. The price will most probably fall this year, as the war with Russia having ended the supply from Saghalien, which has not been in the market for 2 yrs. will again be present this year; yet it is pretty certain that the price will never be under \$40 gold per ton.

FAR EASTERN ENGINEERING, CONSTRUCTION, COMMERCIAL AND FINANCIAL NEWS

PERSONAL

Mr. David J. Lennox, a prominent engineer of Hougkong, has resigned the secretaryship and management of The Institution of Engineers and Shipbuilders of Hougkong and accepted the position of superintendent of the Peak Tramway. Mr. Lennox is very popular in engineering circles of the colony, and his long experience in the profession gives assurance that he will conduct the affairs of the Peak Tramway with ability and success.

RAILWAYS AND BAILWAY SUPPLIES

CHING-HAI RAILWAY, CHINA.—The board of commerce at Peking has sent four secretaries to inspect the Ching-Hai Railway.

Kowloon-Canton Railway. The Peking authorities have rejected the 4th article of the agreement of the Kowloon-Canton Railway, in which it is stipulated that the chief engineer should be recommended and controlled by the Government of Hongkong.

RAILWAY EXTENSION, F. M. S.—A corps of assistant engineers is being engaged to select and survey the route of the proposed extension of the Federated Malay States Railway to Johore and thus establish a rail connection between Penang (Butterick?) and Singapore.

SIAM WANTS RAILWAY SUPPLIES.—The Government of Siam has issued specifications and drawings of tenders for the supply of 67 passenger cars, 7 guard and luggage vans, and 265 goods and ballast cars for the Royal Siamese Railway Department. Sealed tenders will be opened at Bangkok on September 4th, 1906.

RAILWAY DEVELOPMENT IN SHANTUNG PROVINCE, CHINA.—The governor of Shantung has notified Peking that the concession originally granted to Germans for the building of a railway from Chinanfu to Chingting (on the Peking-Hankow road) has been redeemed, and preparations for the construction of the railway and the opening of steam traffic are progressing.

BRITISH LOCOMOTIVES FOR THE PHILIPPINES.—An important contract for supplying eight powerful 6-wheeled coupled bogic freight locomotives for the Manila Railway Company, Ltd., has, in the face of severe continental competition, been awarded to Messrs. Kerr. Stuart & Co., Ltd., of the Californian Works, Stoke-on-Trent. Early delivery was an important feature in the placing of the contract with British engineers, and the locomotives are shortly to be shipped to Manila.

PEKING-KALGAN RAILWAY.—Work on this line is progressing very rapidity under the charge of Taotai Chan, commonly known as Jeme Tienyao, an American-educated civil engineer, and it is expected that the whole line will be completed before the close of the year 1907 instead of 1908, as at first contemplated. Viceroy Yuan Shih-kai wishes it finished and opened to traffic as soon as possible with the view of having the line extended to the Mongolian capital of Urga and beyond as far as the Siberian frontier. All the railway materials ordered from France have arrived at Tientsin and have been delivered to the railway administration. No foreigners are employed on this line.

TRANSKOREAN RAILWAY.—At a recent conference of the Korean chambers of commerce it was decided to urge upon the authorities the desirability of connecting the southern and northern districts of Korea by the construction of a line to complete a Transkorean Railway. There is still a difference of opinion as to whether the line should run from Pingyan to Gensan or from Seoul to Gensan. The former would be a line about 100 ms. long, and the latter about 103 ms. The Pingyang-Gensan line would present difficulties owing to the precipitous heights at Ma Sin-lyong, but a similar obstacle would be found at Thyol-lyong in the case of the Seoul-Gensan line. There is, consequently, not much choice between routes.

ANOTHER CHINESE RAILWAY PROJECT .- The governor of Honan has asked the Peking Government for the construction of a railway line from Loyang to Tungquan on the borders of Shensi, and from Kaifeng to Chinan. He urges that both of these lines are of the utmost importance considering the central position held by Honan, which is in touch with seven provinces. The usual difficulty of funds, however, presents itself, and the length and difficulty of the latter line render its immediate undertaking almost out of the question. In regard to the Loyang-Tungquan line it is different, however, and though it is estimated to cost something like Tls. 5,000,000 for the 480 li, unless it is undertaken the new line from Hsian to Tungkuan which is to be built with the idea of linking up with the Chinghan line can not be connected. The proper Peking authorities have been directed to consider the matter and see what can be done.

ELECTRIC LIGHTING, TRACTION, POWER, ETC.

BENGAL TELEPHONE COMPANY.—This company has started on a big scheme of changing all its overhead wires in Calcutta to underground, involving the laying of 50 ms. of cable.

ELECTRIC LIGHT AT TIENTSIN.—The electric tramway and lighting company of Tientsin, North China, has put its lighting plant in operation and now the city is enjoying this modern convenience.

NEW ROLLING STOCK, MANILA STREET RAILWAY.—
The Manila Electric Railroad and Light Company is adding 14 fine cars to its equipment of rolling stock. Four of the cars are half box and half open, the first-class compartment being closed for protection during the wet weather, and the seats extend lengthwise of the car.

posal of the Singapore Electric Tramways, Ltd., to supply the Municipal Commission with electric energy for lighting and fans at the rate of 12½ cts. per board of trade unit, and to supply energy for prime movers with which is classed energy for arc lamps for the public lighting of streets, at 12½ cts. less a discount of 25 per cent per board of trade unit, and that the charge by the Municipal Commission to the public be fixed at 25 cts. per board of trade unit for electric energy for lighting and fans, and for energy for prime movers at 25 cts., less a discount of 25 per cent per board of trade unit, has been accepted by the commissioners.

CHINA ADOPTS WIRELESS TELEGRAPHY .- The American consul-general at Tientsin reports that the Chinese Government has arranged to establish several stations throughout China for experiment with the Marconi system of wireless telegraphy and instruct Chinese operators in working the same. Apparatus was recently installed on four Chinese men-of-war at Shanghai and at the three North China cities of Tientsin, Peking, and Paotingfu, the radius of action being about 230 kilometers and the cost about Tls. 25,000. An Italian officer has been appointed, not only as instructor, but also as engineer to superintend the installation, and under whom a number of students have already been detailed to act as operators and learn the art of management. It is also said that the viceroys throughout the empire have been directed to consider the advisability of establishing other stations to work in conjunction with those above mentioned.

AMERICANIZED MONGOLIANS. - Mr. Lim Dat, a successful Chinese merchant of Victoria, British Columbia, has organized among his countrymen located there a \$2,000,000 (gold) company to construct an electric trolley railway in China from Canton to San Wu, in China, a distance of 60 ms. No white man need apply for stock, as their presence in the company would forfeit the charter from the Chinese Government. The route of the proposed line is a populous one, Canton having a population of at least 2,000,000 and San Wu 500,000. The prospectus of the new company sets forth that there are no serious topographical difficulties to be encountered in building the line, that water-power will be obtained from the Quai Tong Shun Mountains, 30 ms. from San Wu; that there are now 22 junks plying on the river between these points, carrying heavy cargoes and many passengers; that it takes these junks 14 hrs. to make the trip, which the electric cars will make in 3 hrs. It is also stated that the summer cars will be operated-the climate being warm-and each will be equipped with 50-h. p. motors. The plan is to build the line entirely with Chinese labor, even using Chinese electricians as far as possible. The company also proposes to seek from the City of Canton a concession for light and power privileges.

PUBLIC WORKS

AYALA BRIDGE, MANILA.—The Atlantic, Gulf and Pacific Company hopes to have the reconstruction of the Ayala Bridge over the Pasig River finished by August 13th.

Water and Sewer Systems, Parang and Jolo, P. I.— Henry M. Jones, of Manila, has secured the contract for furnishing the labor and materials for the construction of water and sewer systems at Parang and Jolo. His bid for the Parang works was P42,223 and for the Jolo works P32,373. He agrees to complete his contracts within 300 days after commencement.

ROAD-MAKING IN KOREA. — With reference to a recent statement that a part of the new Japanese loan to Korea will be used for the construction of new roads, the Korean Government has made arrangements to engage four Japanese engineers and eight assistants for this purpose. The survey for the new roads will be carried out between July and November, and the work of construction is to begin next spring.

EXTENSION OF CONTRACT TIME DENIED, MANILA.—Mr. J. F. Case, chief engineer of the Department of Sewer and Waterworks Construction, Manila, has recommended the denial of the application of Messrs. Matson, Lord & Belser, contractors for the construction of the dam and reservoir of the new gravity water supply, for an extension of time for the completion of their work, and the Municipal Board has approved the recommendation. The contractors have been notified by cable of this decision.

IMPERIAL LIBBARY, TOKYO.—The new building of the Imperial Library at Uyeno Park, Tokyo, has been officially opened. It is three stories high and is constructed with all up to date materials. The completed building does not comprise the whole library design. It is only a quarter of the proposed premises and the remaining three-quarters will be built adjacent to the present building. The cost is -Y-320,000. The new building is the largest library in the Orient, containing about 300,000 books.

Public Works in Mindanao, Moro Province, P. I.—
The new fiscal year will mark great activity in the public works of the Moro Province. Besides the projects to be undertaken by the civil government, the chief quartermaster. Department of Mindanao, will spend about -P-250,000 in permanent improvements at the several garrisons of the military. Besides the sewer and water systems at Parang and Jolo, the military will build a dock for the garrison at Cotabato, and a Telford road, cement sidewalks and curbing, and a seawall at Zamboanga. All of the military work will be let by contract.

A BANGKOK BRIDGE.—The bridge near the post and telegraph department in the city, says the Malay Mail, which was closed for traffic a year ago, and then apparently forgotten, is still closed though the long-deferred work of repair has been going on for some time. Now the passage of the tram cars over it is stopped, too, and the passengers have to get out one side and walk, like hens along a rail, across narrow girders about 4 ins. wide at imminent risk of their necks, to a waiting car on the other side. Judging from the rate of progression now observed, it will be some time yet before it is opened to traffic. There were three men and a boy looking at it this morning. One of the men was working hard chewing betel, and the boy was minding some tools which were ostensibly there for some purpose connected with the bridge.

DEPARTMENT OF ENGINEERING AND PUBLIC WORKS, Manilla. - In 1904 the expenses of this department were -P-2,585,979.15, of which salaries and wages consumed -P-912,580.12, the remaining -P-1,946,399 03 being for contingent expenses and public works. The expenses of the department for the fiscal year 1905-06 amounted to -P-2,682,828.87, a saving of -P-176,150.28 on the total expenditure. Of this total amount the sum of -P-1,026,491.99 was expended for salaries and wages, showing an increase of -P-113,911.87, while the contingent expenses and public works caused an expenditure of -P-1,656,336.88, or a saving of -P-290,062.15. In his estimate for the new fiscal year the city engineer asked the Municipal Board for -P-498,409.97 for salaries and wages, and -P-1,379,096.23 for contingent expenses. The board has reduced this estimate -P-804,776.67 less than last fiscal year and about -P-1,000,000 less than the expenses of the previous year.

PORT WORKS, DOCKS, ETC.

WHARF AT PARANG, P. I.-Salvador Farre, Manila, has secured the contract for the construction of a wharf at Parang, his bid being \$\mathbb{P}35,500\$. He agrees to complete the work within 300 days after its commencement.

NEW Dock NEAR Moji, Japan.—The scheme promoted jointly by Japanese, Belgians, and Englishmen to construct a large dock at Tanoura, near Moji, has matured, and the work of construction has commenced. The dock will be capable of accommodating vessels up to 20,000 tons.

SINGAPORE HARBOR WORKS.—Mr. Winston Churchill recently said that the Singapore Chamber of Commerce had made representations against the construction of the proposed harbor works there, but Lord Elgin was not satisfied that the representations embodied the wishes of the trading community, and saw no reason further to delay work which was undertaken on the authority of high experts and after prolonged consideration both in London and Singapore.

KAWASAKI DOCKYARD COMPANY at SHANGHAL.—In explanation of the decision of the Kawasaki Dockyard Company to establish a branch dockyard at Shanghai, it is pointed out that a rapid development of Japanese shipping on the China Coast and the Yangtsze is in progress. The Japanese Guardianship Squadron has also to be taken into consideration, while there is a prospect that the Kawasaki company, which has already successfully built a number of naval vessels for the Chinese authorities, will receive a good many such orders in future.

MINES AND MINING

TIN FROM STRAITS SETTLEMENTS.—The total shipments of tin from the Straits Settlements for 1905 amounted to 63,710 tons, 18,905 tons going direct to the United States, 35,294 tons to England, and 9,511 tons to Continental Europe.

Mines in Amur.—The Tartar general of Heilung-kiang has received a report from an under official to the effect that the mines along the Amur River have been occupied by the Russians. Efforts are being made to drive out the Russians.

Gold-Dust Gathering Machine.—Mr. Naosaburo Minorigawa, a Japanese inventor of filature and drying machines, has made another invention in the shape of a gold-dust drying machine, by means of which the quality of sands containing gold-dust can easily be ascertained.

Foreign Mining Enterprise in Yunnan. — The viceroy of Yunnan reports to the Peking authorities that a number of British and French merchants, styling themselves the Hsing Lung Company, are mining cinnabar in the Chohung Prefecture of Yunnan, and declaring they are doing so in accordance with the treaty. Negotiations have been commenced looking to a solution of what has turned out to be a controversy.

MINERALS OF KOREA .- Consul Mitchell. of Chunking, supplies information concerning the mimeral resources or Korea, as follows:-The mineral output of Korea is princ:pally gold, recovered both by placer and quartz mining, with over 120 workings, and an annual production of about \$2,250,000 gold. Placer gold represents 66 per cent of the total. There are silver deposits, but only experimental workings have been made. Copper is found mostly in the N. and S. portion of the peninsula. The Kap-san mine is producing about 270,000 lbs. of refined copper per annum. Iron is found in several provinces, but the expense of mining and smelting have retarded the exploitation. There are some coal deposits, that at Pyeng-Yang consisting of smokeless coal, and the others of rather inferior bituminous. Excellent crystal is found in North Kyeng-Seng, and is a famous product of Korea. Tale of excellent quality is found at Pyeng-hai and Yee Chun, but has not been worked.

BORNEO OIL OUTPUT.-Following is the output of the oil fields of Borneo for the first 13 weeks of the years 1906 and 1905, in tons:-

	1906.	1905.	REMARKS.
Production— Crude oil Crude oil sold. Intake of re-	115,290	95,070 21,210	rage on the fields and at the mark- eting centers com-
fineries crude oil Output of refine-	79,548	63,735	pelled the practical shutting down of the Balik Papan
ries— Kerosene Other products	28,099 42,732	23,340	Refinery from Feb- ruary 19th to March 31st and the de- struction of
Shipments- Kerosene Other products	23,333 34,643	24,100 34,888	8,700 ts. of crude oil 5,510 " benzine 6,800 " liquid fuel.
Crude oil in sto	ck abo	ve	. 31, 1906. Apr. 1, 1905 74,414 33,430
Stock awaiting s Kerosene Other produ	4.0	A. A. S.	35,887 7,645 19,375 7,925

SHIPBUILDING, MARINE, ETC.

REPAIRS OF BATTLESHIP "Suwo."—The repairs of the battleship Suwo, late Pobieda, were recently completed and the vessel sailed from Shanghai for Japan.

has just had an addition of two submarine boats, which were constructed at the Onohama shippard, Kobé, and their trial run was recently carried out successfully.

ACTIVITY AT KAWASAKI DOCKS.—The Kawasaki ship-building yard, Japan, has finished and sent to China one of the four warships it is building for the Peking Government. The company has recently received an order from the Chinese Government to build six second-class gunboats, ranging from 800 to 1,000 tons each, and four torpedo boats of about 120 tons each.

CABLE LAYING, Japan.—The Japanese Government cableship Okinawa-maru is reported to be engaged in laying a cable between the Bonin Islands and Hachijoga Shima, and the Pacific Cable Company's steamer is connecting the Bonin Islands with Guam. When these lines are completed there will be a direct telegraphic connection between America and Japan.

Captured Foreign Vessels, Japan.—Fifteen of the foreign vessels captured by Japan during the war have been offered for sale by public tender. Among the chief bidders are the Mitsui Bussan Kaisha, the Hokkaido Colliery Railway Company, the Nippon Yusen Kaisha and the Osaka Shosen Kaisha. The Hokkaido Colliery Railway Company is said to contemplate the establishment of a steamship line for coal-transport after its railway is purchased by the government.

OCEAN FREIGHT ROUTE EXTENDED.—The Chargeurs Réunis (a French company) have inaugurated a line of steamers to trade around the world. The vessels start from Havre and Antwerp, and reach San Francisco through the Suez Canal via China and Japan. From San Francisco the liners will take cargo to Mexico, Central and South American ports and for Europe. Vessels will leave San Francisco at intervals of 60 days, and the service is expected to prove of considerable value to the merchants of that city.

MISCELLANEOUS

MANUFACTURE OF SWORDS, TIENTSIN. -The new Tientsin Native Ironworks is reported to have large orders for swords on hand.

MESSES. RILEY, HARGREAVES & Co., LTD., SINGAPORE.

This concern has supplied Tronoh Mines with a
Darracq car which is said to have cost \$5,000 gold.

JAPAN'S PROFITS FROM TOBACCO.—The actual net profits of the tobacco monopoly of Japan for the fiscal year 1905 was -Y-33,284,000, or \$16,642,000 gold, and exceeded the estimated figures by -Y-1,272,000, or \$636,500 gold.

CONTRACT FOR MACHINE OILS, MANILA.—Messrs. Findlay & Co., of Manila, have secured the contract from the Bureau of Supplies, Philippine Government, to supply the latter with fine and crude machine oils for a year. The firm represents the New York Lubricating Company.

AGRICULTURAL IMPLEMENTS, KOREA.—With improving farming methods the Koreans require more elaborate agricultural implements than those heretofore in use, and while there may never be a demand for harvesters and threshing machines, cheap plows, rakes, scythes, and sickles should be appreciated. PINE AND REDWOOD LUMBER CONTRACT, PHILIPPINE GOVERNMENT. - Messrs. Findlay & Co., Manila, have secured the contract for supplying the Government of the Philippine Islands with pine and redwood lumber for the coming 6 mos., during which it is estimated, that 2,002,000 board feet of lumber will be consumed.

MIRROR FACTORY, MANILA.—Messrs. Equires, Bing-ham & Co., of Manila, have just established a first-class modern looking-glass factory in connection with their establishment in Plaza de Goiti. They have installed a plant which will turn out all kinds of mirror work. This is the only factory of its kind in the Orient.

JEHOL TIMBER.—The woods and forests at Jehol are reported to be very extensive, comprising timber which can be used as material for conspicuous buildings, such as the Chien Men Tower, but there is no available route of transportation. The lieutenant-general of Jehol is said to have an agreement with the minister of northern trade looking to the construction of a railway from Lanchow to Jehol.

Machinery in Korea.—The Japanese capitalists interested in Korea have heretofore imported most of their machinery from their own country. Under the present customs tariff, machinery taken into Korea pays 7½ per cent duty, while the same articles are taxed 15 per cent on the total cost and transportation in Japan. An attempt by American and European houses to institute a direct trade in machinery for the numerous sawmills on the Yalu, in mining appliances, and chemicals should be successful.

Bounty to Sugar Growers, Australia.—A new law in Australia provides for the payment after January 1st, 1907, to every grower of white-grown cane or beet a bounty of \$1.50 gold per ton on cane yielding 10 per cent of sugar, to be increased or decreased proportionately according to any variation of the standard, and a bounty of \$15 gold per ton on the sugar-giving contents of the beet. It must be shown that the planter paid the standard rate of wages to the employees. There is to be an excise duty of \$1 gold per hundred on manufactured sugar, but that is to be reduced on sugar produced from cane.

SHANGHAI TRADE REPORT.—According to the official report of Mr. Elgar Hobson, commissioner of Chinese customs at Shanghai, from many standpoints 1905 may be regarded as a record year and as far ahead of any preceding. The gross value of the trade was Hongkong Tls. 443,954,262, and the net value Hongkong Tls. 176.979,193, showing increases of Tls. 39,000,000 and Tls. 31,500,000 respectively over the 1904 totals. The total revenue collection was Hongkong Tls. 12,080,-185, an increase of Tls. 1,775,000 over the total in 1904 and of Tls. 1,125,000 over that for 1902, the best year previously recorded. Nearly the whole of this gain is accounted for under the head of "Imports."

ICE AND REFRIGERATING SAFETY DEVICE. -The Vulcan Iron Works, of San Francisco, which has taken the agency for the Pacific Coast of the United States and the Philippine Islands, is manufacturing a new device recently invented. It is designed to prevent accidents from excessive pressure in ice and refrigerating systems. It is constructed with a sort of safety valve, so connected that when the pressure in the pipes gets too high it disengages a catch, releasing a lever which is actuated by a powerful spring. This lever in turn strikes an electric switch, breaking the circuit and stopping the ammonia compressor. This can be effected in several ways, viz., by cutting off the current when the compressor is electrically driven, by putting out the spark when a gas engine furnishes power or by shutting off the steam power.

ARMSTRONG UNDERTAKING AT HIRATSUKA, JAPAN .-With regard to the undertaking of the Armstrong Company at Hiratsuka, it is understood that the nature of the industry is the manufacture of cordite for the Japanese Navy. The factory is a joint undertaking of three big foreign concerns-Armstrong, Noble, and another. The explosive has hitherto been imported from abroad. Under the present arrangement the expenses involved in the importation. amounting annually to something like -Y-280,000, will be dispensed with, besides the indirect revenue derived from the business tax and import duties on materials. The factory will give employment to about 5,000 laborers. German experts are now engaged in drawing up plans and estimates for the construction of the factory, on the completion of which it is expected that Hiratsuka will become an important town in the prefecture.

SAWMILLS IN KOREA.-Even though the Japanese Government may declare a timber monopoly on the Yalu, the Japanese, while they are excellent carpenters, have never undertaken lumbering on a very extensive scale, and it should be possible for foreigners to establish sawmills on the Yalu where the timber would be purchased from the authorities. The demand for lumber in China is constantly increasing, the imports of soft wood into Shanghai and Tientsin alone amounting to about \$350,000 gold during 1904 The native article is never properly seasoned, for it is generally transported in logs and sawed as needed for immediate building. Large mills operating at Yongampo or Antung would be able to take advantage of the low cost of labor and of the cheap transportation by junks, which make the voyage to Tientsin or Chefoo in from 5 to 10 days, and it would not only supply a long-felt want in China but be an undoubted source of profit to their owners.

RIVER STEAMERS KOREA.—Owing to the character of the streams on the W. coast of Korea the river traffic is as yet in its infancy. The vessels employed are of the type used for deep-sea and harbor

work and are not at all adapted to local conditions. Under the most favored-nation clause it is possible for foreigners to take advantage of the agreement recently concluded between Japan and Korea, granting the subjects of the former the privileges of navigation along the coasts and on the interior waters of the latter state, to introduce a number of light-draft river steamers, stern-wheeled and drawing from 2 to 3'. The rivers are the natural avenues of commerce and a profitable trade only awaits improved methods of transportation.

With a development of this character and the improved communications afforded by the railroads the commercial activity attendant on the influx of Japanese and the opening of new mining districts, the present well-being of the people, thanks to their large earnings during the past year and the additional prosperity that should result under an administration wisely directed by the Japanese, the oportunities for trade and manufacture should offer an attractive field for foreign enterprise and a profitable investment for foreign capital.

FINANCIAL

YINGKOW BRANCH OF THE RUSSO-CHINESE BANK .- This branch has been reopened to business in the Russian consulate building.

GOLD COINS FOR SIAM.—It is announced that the Siamese Government is making arrangements to put gold coinage in circulation shortly. The gold pieces will be of Tes. 20 and Tes. 10 value respectively.

pany intends to increase its capital by -Y-500,000. The company at present owns an authracite field which is said to turn out 10,000,000 lbs. of coal permonth.

BANGKOK DOCK COMPANY.—The Bangkok Dock Company made a profit of Tcs. 155,000 in 1905. A 121/2 per cent dividend and 2 1/2 per cent bonus have been distributed among stockholders, the total sum being Tcs. 109,000.

CHINA MUTUAL STEAM NAVIGATION COMPANY.—The directors of this company have recommended dividends of 5 per cent on the ordinary and on the ordinary "B" shares for 1905, leaving a balance of £12,052 to carry forward.

BIG FOREIGN LOAN TO JAPAN.—It is announced that Jacob Schiff, the American banker and railway promoter, has agreed to loan to Japan -Y-2,000,000,000 on the security of Japanese railways when they are consolidated under the nationalization scheme.

Korean Waterworks.—This Company have been registered with a capital of £250,000 in £1 shares, to adopt an agreement with the S. W. Syndicate, Ltd., for the acquisition of a concession for the construction and maintenance of waterworks in Seoul and elsewhere in Korea, and to carry on the business of a waterworks Company in all its branches.

JAVA CAOUTCHOUC COMPANY.—This company has been established at Amsterdam with a capital of fl 200,000, divided into 200 shares of fl.1,000 each, which are all taken. The object of the company is the cultivation of caoutchouc and other produce in Netherlands India, with the exception of the districts of Djokjokarta and Soerakarta, and the sale of the produce in foreign ports.

SINGAPORE SLIPWAY COMPANY.—The 1905 working of this company resulted in a loss of \$9,965.16 owing to depression in the shipping trade; in consequence, at the recent annual meeting of the shareholders, the directors announced that they had decided to write back to profit and loss \$10,000 placed to reserve in December, 1903. The sum of \$2,879.11 has been written off account depreciation of property, plant, etc., and \$1,410.85 off account bad debts. This, after deducting the credit of \$2,539.44 brought forward from 1904, left a debit balance at profit and loss of \$1,715.68 to be carried forward to the current year.

Tarlac (P. I.) Railway Company — Articles of incorporation of the Tarlac Railway Company have been filed at Manila with the chief oi the Division of Archives, Patents and Copyrights. The board of directors comprises Walter E. Olsen, Manila; Vicente Bengzon, Camiling, Tarlac; Melecio Cajuanco, Panique, Tarlac; J. F. Case, Manila; Arcadio del Rosario, Panique; E. E. Elser, Manila; A. V. Dalrymple, Tarlac; and H. Thurber, Manila. The capital stock of the company is -P-150,000 divided into shares of -P-100 each, and the project of the company is to construct and operate a steam tramway between the Panique Station of the Manila & Dagupan Railway to the Pueblo of Camiling, in Tarlac Province, Northern Luzon.

CHARTERED BANK. - The balance sheet and profit and loss account of the Chartered Bank for the year ended December 31st, 1905, recently made public, show a net profit, after providing for bad and doubtful debts, of £342,111 14s 4d, inclusive of £80,078 15s 8d brought forward from the previous year. The interim dividend at the rate of 12 per cent per annum paid in October last absorbed £48,000, and a further sum of £17,000 has been appropriated to pay a bonus of 10 per cent on the salaries of the staff. The amount available is, therefore, £277,111 14s 4d out of which the following will be paid:-Final dividend at the rate of 14 per cent per annum, making 13 per cent for the whole year; add £100,000 to the reserve fund, which will then stand at £975,000; add 10 per cent to the officers' superannuation fund; write off premises account, £25,000, and carry forward the balance of £85.111 14s 4d. The fees of the directors have been increased from £4,000 to £6,000 per year.

FAR EASTERN SHARE QUOTATIONS

COURTESY OF BENJAMIN, KELLY & POTTS, SHAREBROKERS, HONGKONG, June, 1906.

STOCK	WHEN ESTAB- LISHED	CAPITAL	NO. OF	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN	Approximat Return at Present Quotation	CLOSING QUOTATIONS
Banks.											PER CENT	
Hongkong and Shanghai Banking (1865	\$10,000,000	80,000	\$125	1.00	\(\begin{array}{c} g \delta 1,000,000 \\ s \ \\$9,500,000 \\ i \ \\$250,000 \end{array}	\$1,699,777	31-12-05	\(\Lambda 1.15/- \text{div. & \Lambda 1 bonus @ ex.} \) \(2/\text{0-9/16 \$26.87 for second half-} \) \(\text{year 1905}	26 2-06	53/4	§\$810 (London £91
Vational Bank of China, Limited	1891	€699,475	(10)99,925	£7	£5	The second secon	\$74,099	31-12-05	\$2 (London 3/6) for 1903	1-2-04		\$38
Marine Insurances.						/ M- ()						\$360
anton Insurance Office, Limited	1881	\$2,500,000	10,000	\$250	\$50	\$1,600,000 { i \$147,895 {	\$211,540	31-12-04	\$20 for 1904		51/2	\$300
orth China Insurance Co., Ld	1863	€150,000	10,000	€15	€5	\begin{cases} g & 100,000 \\ s Tls. 100,000 \\ f Tls. 50,000 \\ (s \$2,000,000 \)	Tls. 302,053	30-6-05	{ Interim div. of 716 @ ex. 2110 } 15=Tls. 2.62. on alc 1905 }	5-1-06	53/4	Tls. 85 sales
nion Insurance Society of Canton,) Limited	1867	\$2,500,000	10,000	\$250	\$100	g £40,000 f \$331,131 j \$1,153,844	\$2,792,271	31-12-05	Interim div. of \$30 for 1905	30-4-06	5	\$800 buyers
angtsze Insurance Association, Ld	. 1862	\$800,000	8,000	\$100	\$60	\$569,279 \ \$800,000 \ \$61,278 \ f \$15,527	\$508,334	31-12-05	\$12 and \$3 special dividend for 1904	19-4-06	81/2	\$175
Fire Insurances.						(\$, man and)				0.2.06		\$85
hina Fire Insurance Co., Ld	. 1870	\$2,000,000	20,000	\$100	\$20	1 6 \$2 616			\$6 for 1904		7	
longkong Fire Insurance Co., Ld	. 1868	\$2,000,000	8,000	\$250	\$50	\$1,220,928	\$422,618	31-12-05	\$25 for 1904	8-3-06	8	\$305
Shipping.							\$6 -60	** ** **	ATV for tope	15-3-06	71/	\$21 buyers
hina and Manila Steamship Co., Ld			(1) 30,000		\$25	\$6,000	ро,503 Nil.		\$1½ for 1905		834	\$40 buyers
ouglas Steamship Co., Ld	1883	\$1,000,000	20,000	\$50	\$50	1 \$88,941 5		30.0.03	\$3/2 101 Juli Chaca 30 0 1903		74	
longkong, Canton and Macao Steam-) boat Company, Ld	1865	\$1,200,000	80,000	\$15	\$15	di \$600,000 } f \$154,331	\$24,080	31-12-05	\$1 for 2nd half-year mak. \$2 for 1905	16-2-06	8	\$24¾ buyers
ndo-China Steam Navigation Com-) pany, Ld	1882	m £600,000	(2) 60,000	£10	€10	$ \begin{cases} i & £ 120,000 \\ i & £ 241,150 \\ h & £ 3,999 \end{cases} $	£4,435	31-12-04	12/- @ 1/10 7/8==\$6.29.51 for 1904 (Final of Tls. 3. making ()	13-7-05	81/2	\$75 sellers
Shanghai Tug and Lighter Co., Ld) Do. Preference)	1903	Tls.1,500,000	{ 200,000 } 100,000 }		Tls. 50	i Tls. 40,000	Tls. 23,156	31-12-05	Tls. 5 for Final of Tls. 134 making 1905	13-3-06	§ 8 7	Tls. 63 sales Tls. 51 buyers
Shell" Transport & Trading Co., Ld.	1898	€2,000,000	2,000,000	£1	£1	\$ \$400,000 }	£107,815	31-12-04	1/- (Coupon No. 6) for 1905	1-1-06	4	27/-
Star" Ferry Co., Ld	1898	} \$200,coo	10,000	\$10 \$10	\$10 \$5	\$65,000 (\$1.50 75 cents { for year ended 30-4-1906	A CONTRACTOR OF THE PARTY OF TH	\ 5 3½	\$30 \$21
aku Tug & Lighter Co., Ld		Tls.1,500,000	30,000	Tls. 50	Tls. 50	Tls. 98,000 d Tls. 350,479 e Tls. 48,000 d Tls. 81,200		31-12-05	Final of Tls. 2 making Tls. 4 for 1905	1-3-05	9¾	Tls. 41 buyers
Refineries.						\$850,000 }		31-12-05	Final of \$15 making \$25 for 1905	22-3-06	15	\$165
China Sugar Refining Company, Ld				\$100	\$100	(* \$86,129)	Dr. \$132.588	31-12-05	\$3 for 1897	24-3-98		\$25
erak Sugar Cultivation Co., Ld		\$700,000 Tls. 350,000		Tls. 50	and a	Tls. 100,000	Tls. 3.723	31-7-05	Tls. 21/2 for year ending 30-9-1904	20-12-04		Tls. 102 1/2 buye
Mining.						(2 (0-00)						
Chinese Engineering & Mining Co., Ld					£I	(h £12,289	£13,355		1/-(No.6) int.d.for12 m.endg.28.2.06		7	Tls. 10 Nomina
Priental Consolidated Mining Co., Ld	1901	G.\$5,000,000		G. \$10		16	G. \$909,050		Final of 50 cts. mak. G. \$1 for 1905		7	G. \$14
Raub Australian Gold Mining Co., Ld.	. 1892	£200,000}	50,000	LI	18/10	f. A. 073	Dr. £8,745	31-3-05	No. 12 of 1/-=48 cents	28-1-01		\$3 buyers

STOCK	WHEN ESTAB LISHEI	CAPITAL	NO. OF SHARES	VALUE	PAID UP	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN	Approxima Return a Present Quotation	QUOTATIONS
											PER CENT	
Docks, Wharves and Godowns.												
enwick (Geo.), & Company, Ld	1889	\$450,000	2 18,000	\$25	\$25		\$8,915	31-12-05	\$2 on old & \$1 on new issue for 1905	12-3-06	9	\$22
ongkong and Kowloon Wharf and } Godown Co., Ld	1886	\$2,000,000	40,000	\$50	\$50	1 : \$20,000			Final of \$31/2 making \$6 for 1905		534	\$103
ongkong & Whampoa Dock Co., Ld.	1866	\$2,500,000	50,000	\$50	\$50	\$49,500			\$6 for second half year 1905			
ew Amoy Dock Co., Ld	And the second	\$67,500	10,000	\$634	\$634	\$88,000			\$1 for 1905			
anghai Dock and Engin'g Co., Lt	1901	T5,520,000	55,200	T100	T100	T1,000,000			Interim of Tls. 4 for year 1905-6.		1014	Tii5 sellers
anghai and Hongkew Wharf Co. Lt.	1902	T3,200,000	32,000	T100	T100	7 T100,734	T57,065	31-12-05	Final of T8 making T14 for 1905	29-3-06	614	T225 sellers
ulcan Ironworks, Ltd	1905	T500,000	1,000	T500	T375			-	First year	-		T375 buyers
angtsze Wharf and Godown Co., Ld		T250,000	2,500	Tioo	T100	T30,000	T5,668	31-12-05	T18 for 1905	31-3-06	81/4	T220 buyers
Lands, Hotels and Buildings.												
nglo-French Land Investment Com-	1906	T2,500,000	(3) 25,000	T 100	T100				First year			T100
stor House Hotel Co., Ltd	1901	\$750,000	(4) 30,000	\$25	\$25	\$14,156	\$9,028	30-6-05	\$2½ for year ending 30-6-1905 Final of T6½ making T11½ for (20-8-05		\$31 buyers
stor House Hotel, Ld. (Tientsin)		T100,000	2,000	T50	T50	T34,000	Trora	28-2-06	1 Trum or Told mumb /	25-4-06	71/4	Ti47 sellers
entral Stores, Ld)	6,000	\$15	\$15	Se T8,000			(\$2.40 on \$12 for 1905	13-3-06	1314	\$18 sales
Do. (Founders')	The Dunney	\$451,845	123	\$15	\$12	_	\$4,719	31-12-05	None	13-3-06	-	\$300 buyers \$15 4 sellers
Do. (NewIssue)		1 10 1 10 1	24,000	\$15	\$15	}						
ongkong Hotel Co., Ld		\$600,000	12,000	\$50	\$50	\$648,975	\$619	31-12-05	\$5 for 2d half-year making \$10, 1905	6-3-05	7 1/2	\$130
ongkong Land Investment and) Agency Co., Ld		\$5,000,000	50,000	\$100	\$100	\$20,000	\$67,831)		Final of \$31/2 making \$7 for 1905			\$118
otel des Colonies Co., Ld	1002	T225,000	9,000	T25	T25	n T29,783	T1,935	31-3-06	Final of 6% making 10% for 1905	31-5-06	14	Ti8 sellers
otel Metropole Company, Limited		\$200,000	2,000	\$100	\$100	none	\$4,699	30-6-05	Final of \$6 making \$10 for the year.	26-7-05	IO	\$100
umphreys' Estate & Finance Co., Ld.		\$1,500,000	150,000	\$10	\$10				80 cents for 1905		7	\$111/2
owloon Land and Building Co., Ld		\$300,000	6,000	\$50		1 e \$50,000 none	\$574	31-12-05	\$2½ for 1905	7-2-06	61/2	\$39
anghai Land Investment Co., Ld		T2,600,000		T50		f T869,403	T52,194	31-12-05	Final of Tls. 3 making T6 for 1905	23-2-06	5	T1161/2 sales
ientsin Land Investment Co., Ld		T772,600		Troo		i T71,588	PM 0		Final of Tls. 5 making Tls. 8 for 1905			Tiio
		\$625,000		\$50	\$50			1	Final of \$1.90 making \$3.65 for'os		Francisco Control	\$53
est Point Building Co., Ld	, 1009	\$025,000	12,500	\$30	4,50	none		3				
Cotton Mills.											-	
wo Cotton Spinning and Weaving } Co., Ld	1895	T1,000,000	(5) 20,000	T50	T50	T45,939	T100,000	31-10-05	T8 for year ended 31-10-1905	18-12-05	111/2	T70 sales
longkong Cotton Spinning, Weaving) and Dyeing Co., Ld	1901	\$1,250,000	125,000	\$10	\$10	e \$30,000	\$23,264	31-7-05	\$1 for year ended 31-7-1905	4-9-05	7	\$14 buyers
co., Ld	1895	T750,000	(6) 10,000	T75	T75	T100,000	T18,718	30-9-05	Interim of 3 % a/c 1898	30-4-98		T64 sellers
aou-kung-mow Cotton Spinning & } Weaving Co., Ld	1895	T800,000	(7) 8,000	Tioo	Tioo	none			Tls. 8 for 1905			
bey Chee Cotton Spinning Co., Ld Miscellaneous.	1895	T1,000,000	2,000	T500	T500	l T18,456	T35,986	31-12-05	Tls. 25 for 1905	7-3-06	8	T310 sellers
nglo German Brewing Co., Ltd	1004	\$100,000	4,000	\$100	\$100	none	\$1,066	31-12-05	\$7 for 1905	1-3-06	714	\$95 sellers
ell's Asbestos Eastern Agency, Ld				12/6		Professional Line			Is. 3d for 1904		9	\$71/2 buyers
ampbell, Moore & Co., Ld			1,200						\$3 for 1905		914	\$32
nina-Borneo Co., Ld						none			\$1 for 1904		5 -	\$7 buyers
hina Flour Mill Co., Ld		T200,000		***				The state of the s	Final of T 5 making T 10 for 1905	4	1	T8o sales
hina Light and Power Co., Ld		\$500,000							60 cents for year ending 28-2-1906.			\$1014
hina Provident Loan and Mortgage					\$10				So cents for 1305			\$9
Co., Ld					\$ \$6				\$1.20 for year ending 31-7-1905			

STOCK	WHEN ESTAB- LISHED	CAPITAL	NO. OF SHARES	VALUE	PAID UP	B	RESERVE	AT WORKING ACCOUNT	DATE	LAST DIVIDEND	WHEN	Approximat Return at Present Quotation*	CLOSING QUOTATIONS
MiscellaneousContinued												PER CENT	
Green Island Cement Co., Ld	1889	\$1,500,000	150,000	\$10	\$10	10	\$410,000 } \$500,000 }	\$52,291	31-12-05	\$2 div. & 50 cents bonus for '05	26-2-06	81/2	\$2834
Hall & Holtz, Ld		\$420,000	21,000	\$20	\$20		\$186,000	\$20,893	28-2-06	\$2½ for year ending 28 2-06	26-4-06	111/4	\$22 sales
Hongkong Electric Co., Ld			60,000	\$10	\$10		none	\$2,568	28-2-06	\$1.00) for 10 months ending) 65 cents \ 28-2-06	13-5-06	734	\$15 1/2 sales
Hongkong High-Level Tramways)	1887	\$125,000	1,250	\$100	\$100		\$50,000	\$2,796	30-11-04	\$15 for year ending 30-11-04	24-12-04	61/2	\$235
Hongkong Ice Company, Ld	1881	\$125,000	5,000	\$25	\$25	k	\$80,000	\$3,776	31-12-05	Final of \$15 making \$19 for 1905	16-2-06	8	\$240 buyers
H'kong Rope Manufacturing Co., Ld		\$500,000	50,000	\$10	\$10		\$61,000	\$5,813	31-12-05	\$9 for 1905 On 5 shares	15-3-06	61/4	\$29
Hongkong Steam Waterboat Co., Ld	1900	\$150,000	15,000	\$10	\$10		\$2,500	\$88	30-9-05	final of 50 cents making \$1 for } year ended 30-9-1905	24-11-05	11	\$9
Maatschappij tot Mijn-, Bosch-en Landbouwexploitatie in Langkat	1902	Gs.2,500,000	25,000	G.100	G.100	{ i	T547,500 } T27,603 }	T10,374	31-10-05	(Wiret amortarly dividend of Tall)	15-3-06	9¾	T230 buyers
Mondon, (E. L.) Ld	1902	T350,000	7,000	T50	T50		none	Dr. T81,060	31-12-05	T5 for 1902	2-5-03		T25 sellers
	1904	\$675,000	67,500	\$10	\$10		none	Dr. P34,324	31-12-05	None	-		\$5 buyers
Shanghai Gas Co., Ld		T800,000	16,000	T50	T50	d	T165,000	TII,017	31-12-05	T3 final & T1½ bonus making \in all T8½ for 1905	7-3-06	61/4	Ti35 sellers
Shanghai Horse Bazaar Co., Ld	1904	T270,000	5,400	T50	T50		T45,000	T9,751		T6 for 1904	17-3-05	II	T55 sellers
Shanghai Pulp and Paper Co., Ld		T450,000	4,500	Troo	T100	Se	T37,000 } T8,000 }	T2,753	31-12-05	Final of T8 making T14 for 1905	27-2-06	9¼	T150 sellers
Shanghai Sumatra Tobacco Co., Ld	1902	T600,000 (9) 30,000	T20	T20	3 701	T24,820 }	T1,452	31-10-05	Final of T3 making T5 for the year.	15-3-06	7	T72 sales
		€288,000	8,175	€20	£20 }			T85,592	31-12-05	Final of 37/6 making 52/6 for 1905			T ₃ 70 sellers T ₂ 80 sales
South China Morning Post, Ld	200	\$150,000	6,000	£20 \$25	\$25		none	Dr. \$44,089	29-2-05	None		_	\$20
Steam Laundry Co., Ld		\$100,000	30,000	\$5	\$5		none	\$1,134	31-5-05	50 cents for year ended 31-5-05	20-11-05	81/4	\$6
Γientsin Waterworks Co., Ld	1901	T200,000	2,000	T100	Tioo	1 0	T15,259 1 T4,000 1	T1,012	30-4-05	Interim of T4 for year 1905/6	12-2-06	734	T. 110
United Asbestos Oriental Agency, Ld.) Do. do (Founders')	1896	\$100,000	9,900	\$10 \$10	\$4 }			\$551	31-5-05	{ 80 cents } for year ended 31-5-05	29-7-05	{ 9 11	\$9 \$180
Watson (A. S.) & Co , Ld	1886	\$900,000	90,000	\$10	\$10	3	\$300,000 }	\$7,734	31-12-05	Final of 50 cents making \$1, for 1905	14-5-06	7 1/2	\$13¼ buyers
William Powell, Ld		\$150,000	15,000	\$10	\$10	e	\$4,500	\$676	30-6-06	{ Interim div. of 50 cents for the } year 1905/6	10-4-06	10	\$101/2

LOANS AND DEBENTURES	AGENTS FOR THE LOAN	AMOUNT OF LOAN	PAR	OUT- STAND'G BONDS	WHEN PAYABLE	CLOSING QUOTATIONS
China Government, 7 per cent. Silver Loan 1886 E	Bkg. Cor.		Treo	å all €431,960	Mar. 31st & Sept. 30th each year until Mar. 31st, 1917. Half yearly, June 30th and December 31st	To5 Plus accrued interest par.

a Auhorized capital \$2,000,000.
b Building Reserve Account.
c Capital Reserve Fund.
d Depreciation Fund.
e Equalization of Dividend Fund.
f Exchange and Investment Fluctuation Account.
g Gold Reserve Fund.

h Exchange Reserve Account.
i Insurance Fund.

Reinsurance Fund.

& Contingencies Account.

Legal Reserve Fund.
 M Authorized Capital £1,200,000.
 N Sinking Fund.

p Premium on New Issue.

r Repairs and Renewals Account.

s Silver Reserve Fund.

" Underwriting Suspense Account.

w Special Works Fund.

x Extra Reserve Fund.

y 72,560 owned by the Company. z 6,000 shares unissued.

1 5,725 shares unissued.
2 First issue of 60,000 of which 10,411 unalloted.
3 5,000 shares unissued.
4 7,600 shares unissued.

5 5,000 shares unalloted.

7 842 shares unissued.

6 1,616 shares unalloted.

8 14,000 shares unissued.

9 17,000 shares unissued. * Based on last year's dividend.

Only Tls. 134,000 taken up.

216 held by the Company.

In certificates of £20 and £100.

Redeemable in 10 years, or at option of Company the Company giving 6 months' notice.

Redeemable at par at rate of £10,000 per annum from 31st December, 1903, to 31st December 1952.

Dr. Deficit.

SINGAPORE SHARE QUOTATIONS.

COURTESY MESSRS. FRASER & Co., BROKERS, SINGAPORE, JUNE, 1906.

NAME	DATEOF FOR-	CAPITAL	CAPITAL PAID UP	NO. OF SHARES	ISSUE		RESERVE	LAST DIVIDEND	HIGHEST		QUOTATION	
	MATION											
Mining.		#ann 000	200.000	30,000	10	10			5.00	4.00	5.00 sales	
lat Tin Mining Co., Ltd	. 1903	\$300,000	300,000	30,000							ers 12.50 sell	
rsawah Gold Mining Co., Ltd	1900	\$175,000	140,000	10,000 I 4,000	10	10					8.00 sell	
ff Development Co., Ltd		£400,000	350,000	350,000 2	I		******				5.00 selle	
iseh Hydraulic Tin Mining Co., Ltd	. 1901	\$600,000	600,000	60,000	10	10					2.00 selle	
dana Gold Mining Co., Ltd	1901	\$300,000	300,000	10,000	10	10			****		IO.00 nom	
chau Goldfields, Ltd. Fully paid	1902	£20.000	16.175.7/-	6,207	I	I			*****		in liquidat	
" Contrib		£,60,000	60,000	10,493 3	£I	£1	*************	20 % paid for 1905		***** *****	13.00 sale	
ita Tin Mines, Ltd	ISCI	2,00,000	00,000		~					12.25	ers 14.50 buy	
antan Tin Mining Co., Ltd	. 1905	\$150,ccc		9,900 4	IO	10	20,000	30 % paid for 1905	14.50	1.60	1.60 sale	
ang Corporation, Ltd	1 0	₹ 250,000	244,306	360,000	I	I			0.50	0.45	0.50 sale	
ang Kabang, Ltd		£375,000	375,000 {	15,000	1	I	*********	1/6 interim for 1906	12.00	11.65	12.00 buy	
ing Lama Tin Mines, Ltd	. 1904	£120,000		98,000 <i>6</i> 36,700	I	1		1/0 111011111 101 1900		*****	nominal	
ensland Raub G.M.Co., Ltd. Fully paid	1901	€146,700	100,866	110,000	1	11/8				******	nominal 3.00 selle	
b Aust. Gold Ming. Co., Ltd. Fully paid	1892	€,200,000	191,250 }	50,000	I	18/10	4,873	Is. paid January, 'oI			71-	
ti ti ti Contrib)	~	1,800,000	18,000 7	100	100		32% for year ending ar-rais			390.00 buy	
ljang Lebong Mining Co	1900	\$220,000		22,000	IO	The same of	**********	January Marchaeller, Francisco		****** ** **	3.25 buy 6.50 sale	
au Tin Co., Ltd	100	\$230,000	230,000	23,000	IO	.10		1 12 13	******* **		ers	
noh Mines, Ltd		€160,000	149,185	149,185 8	I	I		3s. interm.	21.25	20,00	21.00 se	
Rubber.												
lo-Malay Rubber Co., Ltd	. 1905	€150,000	140,000	140,000 9	I	I		************		**************************************	£2 175 60	
rownie Rubber Estate, Ltd	1995	\$200,000	100,000	20,000	IO	6		*****************			\$12.00 sel	
a Caves Rubber Co., Ltd. Fully paid	1 1904	£30,000	11,125	7,000 I	I	7/6		******* **************		*** *******	21 03.0	
u Unjor Rubber Co., Ltd	1905	\$700,000	610,000	61,000 /	I IO	10	The state of the s		The second secon	23.75	\$24.00 sa lers	
				54,000 Z	2 I	T					£4 25. 6	
it Rajah Rubber Co., Ltd. Fully paid.	1903	£70,000	59,250	7,000	I	15/-					£3 175.6	
lewood Rubber Co., Ltd	1906	\$150,000	125,000	12,500 /	3 10					9.00	£3 05.0	
ly Rubber Estates Co., Ltd	1904	€12,000	10,500	6,000	I			***********				
solidated Malay Rubber Estates, Ltd.		£75,000	55,000	55,000 I	4 I	I				*** *******	£ 2 35.3	
bury Rubber Co., Ltd	1906	\$250,000	225,000	22,500 /	5 10	10					£1 75.0	
acca Rubber Plantations 71/2% Pref Ordinary Fully paid.	1	£300,000	260.625	115,000	I	I			1	€1.4	£1 4s. 0	
Contributory.	1900	2,300,000	200,023	45,000	I	2/6					nominal	
aling Rubber Estates Syndicate, Ltd	. 1903	£30,000	20,000	20,000 I	HILL THE COLUMN			7½% interim for 1905				
u Planting Co., Ltd	1904	\$200,000	0	1,350 I 850 I	7 100	100		10% for 1905		*** ******	\$200.00 S	
dycroft Rubber Co., Ltd	1898	£30,000	26,300	26,300 I	9 I	I	***********			***** ****	£0 05.00	
gapore & Johore Rubber Co., Ltd	1 1002	\$100,000	91,500	150	100	100					\$225.00 S	
ne Rubber Company, Ltd Contrib	7005	\$100,000	88,000	8,800 2	0 10	10			15.00	14.50	11111111111111111111111111111111111111	
gei Way (Selangor) Rubber Co., Ltd	1 rons	€50,000		6,920 2		7				***** ****	£2 05.0	
		€60,000		35,000	2 1	7/-				****** *****	£5 6s. 0	
lambrosa Rubber Co., Ltd	1904	\$ 00,000	50,000	50,000 2								
General.	1804	6= 277 TO 0	CA 648 TE 0	7,438	12/6	12/6		10% dividend for 1904			7.00	
s Asbestos Eastern Agency, Ltdser & Neave, Ltd	1898	\$225,000	225,000	4,500	50			15% dividend for 1905	. 102.00	100,00	102.00 sal	
			224 800	2 2 4 9 2	2 700	100	5 000	7% for 1904		*****	5.00 se	
gan & Co., Ltd	1904	\$480,200	334,800	3,348 2	3 100	100	5,000					
ong and Shanghai Banking Corporation	n 1865	\$10,000,000	10,000,000	80,000	125	125	9,500,000 28	(vear ending 31-12-05		*****	755.00 00	
				100	TOO		250,000 29			*********	142.50 bu	
warth Erskine, Ltd7º/o Pref	1901	\$2,400,000	6,000	100	IOC				* *******	* ********	112,0000	
rnard & Co., Ltd		\$34,000	34,000	3,400	10	10		15% for year ending 31-10-0. (10% and 21/2% bonus fo	r	*** ******	19.00 00	
v. Hargreaves & Co., Ltd	1 ,800	\$875,000	875,000	6,000	100			vear 'O4			115.00 sa	
" 7% Pret	1			2,750	100)	(//o 101 Acar 1204				
gapore Cold Storage Co., Ltd	1903	\$600,000		24,000 2		1 - COD 10	19,000	121/2% for year ending 31-7-0	4	********	67.50 se	
gapore Dispensary, Ltd		\$30,000		2,000	100			5% interim for 1905				
	TO THE REAL PROPERTY.	\$500,000	421,500	5,000 2		100	400,000	10% for 1905			147.50 bt	
its Steam Ship Co., Ltd	1890	\$300,000	421,500	3,000 2	7		169,228 30	10% & 5% bon. ½ yr. end			10 00 00	
aits Trading Co., Ltd	1887	\$3,000,000	2,500,000	250,000 2	26 10	10	1,021,395 3	30-9-05				
jong Pagar Dock Co., Ltd	1864	\$3,700,000	3,700,000	37,000	100	001		\$6 for half year ending 31			500.00 sa lers	
Debentures. \$											2% prem	
warth Erskine Ltd. 6 per cent 600,0	00			*** *** ********			** **********				3% pren	
gapore Municipal 6 " 400,0		The second secon							The state of the s		A CARACTER STATE OF THE STATE O	
4 4 602,3	00				** *****						2% pien	
ey, Hargreaves & Co., Ld. 6 p. cent 225,0 ijong Pagar Dock Co., Ld. 6 ' 250,0 '' '' 5 '' 1,365,5				** *** *******	** ******	* ******	** **********				2% prem	
ijong Pagar Dock Co., La. o 250,0	00	**************		** *** ***** ****							. 1/2 % pret	

 I 3,500 unissued
 6 22,000 unissued

 2 50,000
 11

 3 13,300
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 4 5,100
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 9 10,000
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II 9,000 unissued

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I4 20,000 ''

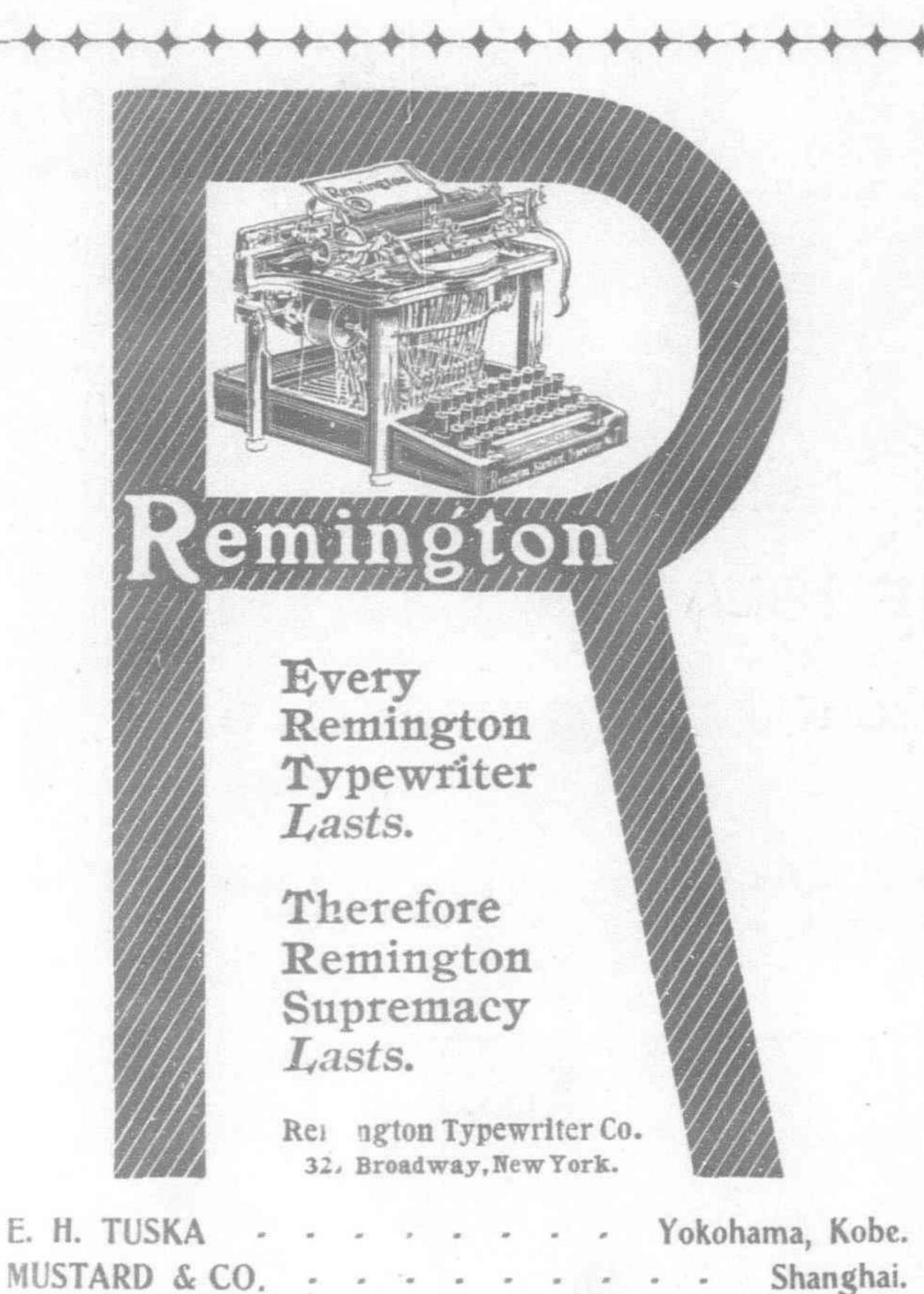
I5 2,500 ''

16 10,000 unissued Mort. £5,000 17 650 " 18 150 " 19 3,700 "

20 1,200

21 8,080 unissued 22 10,000 "* 23 1,454 "* 24 36,000 "* 25 785 "* 26 50,000 unissued 27 Special Gold Reserve F 28 Silver Reserve Fund 29 Insurance Fund 30 Sundry Reserves

31 Sundry Reserves



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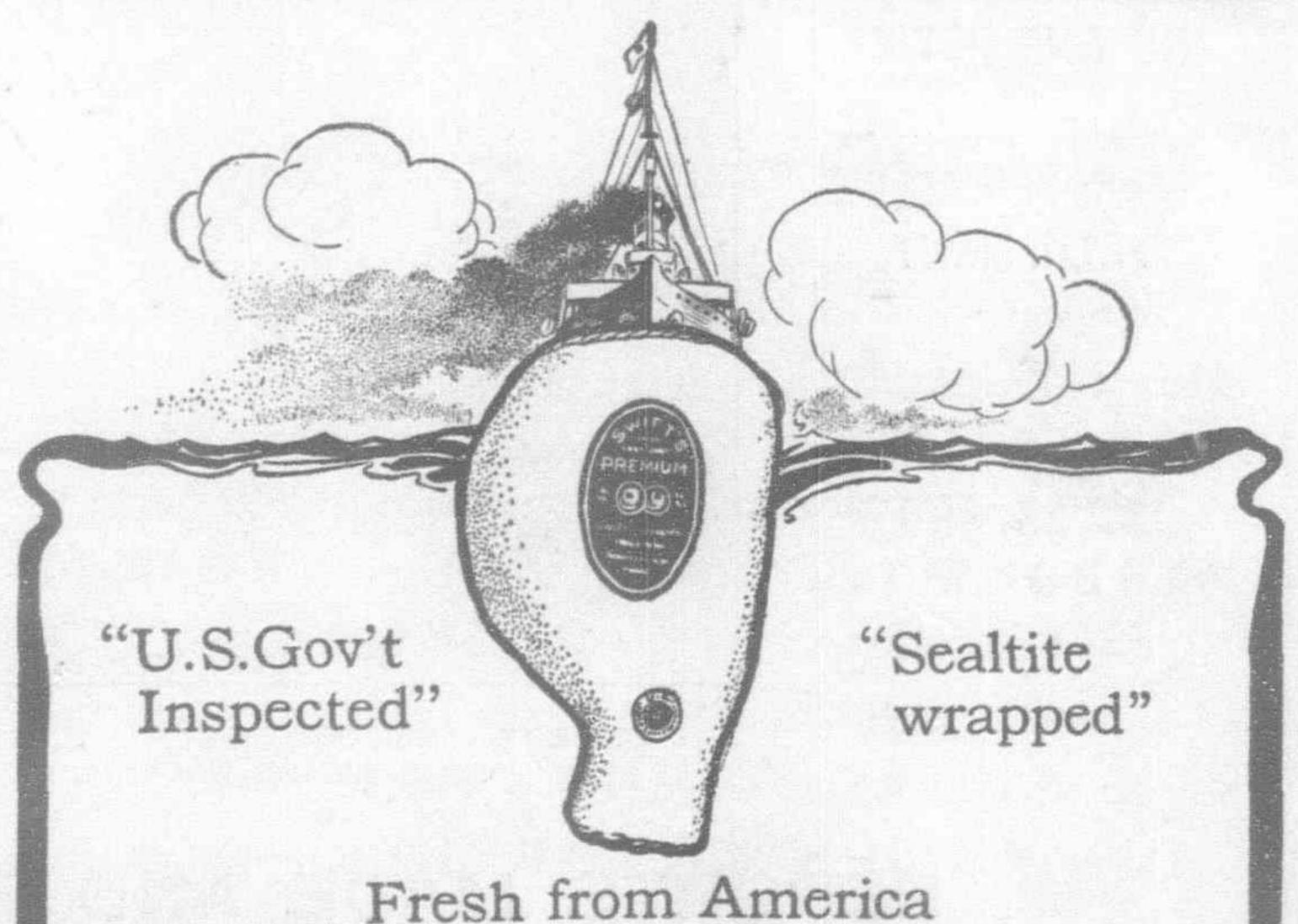
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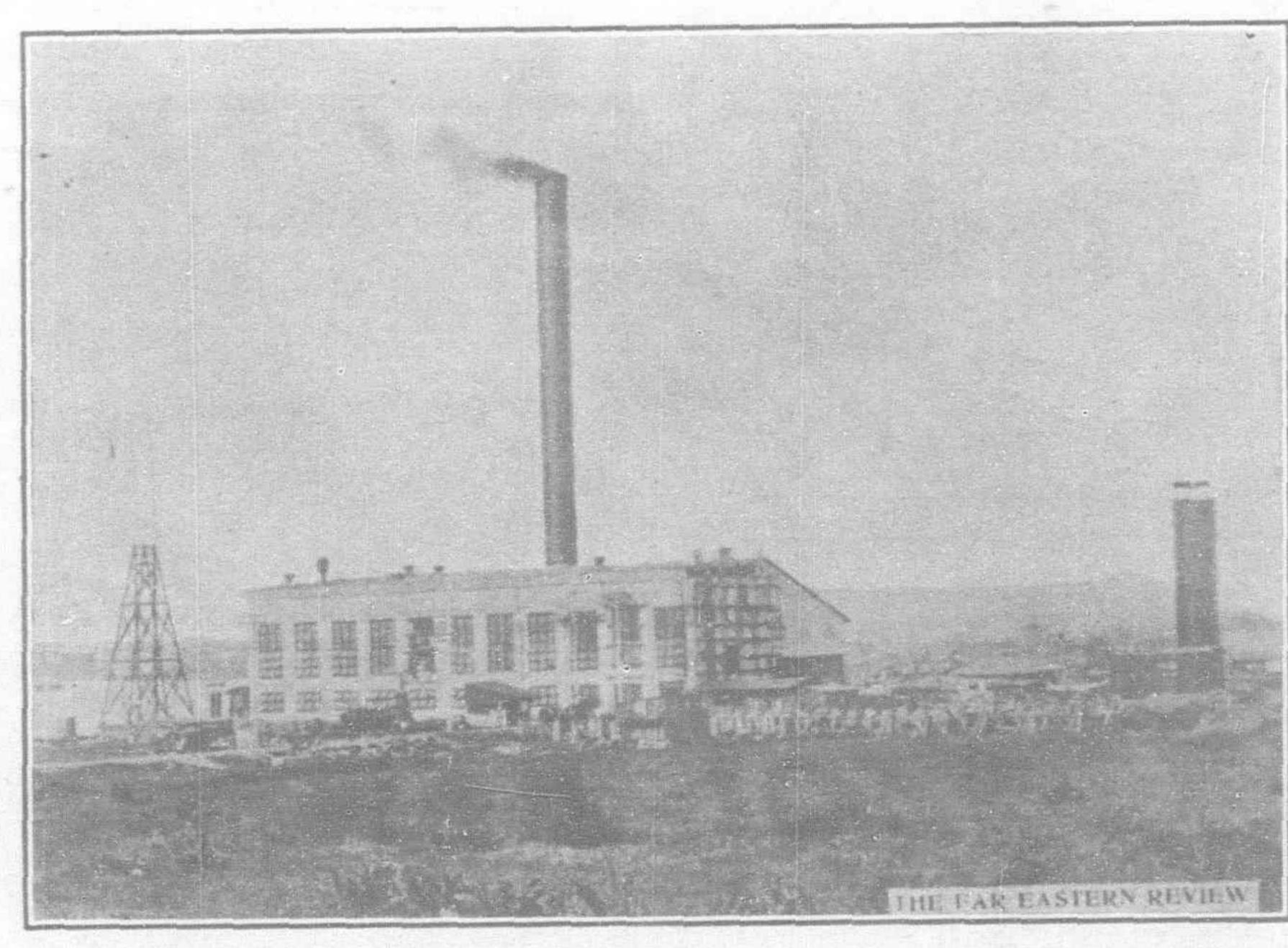
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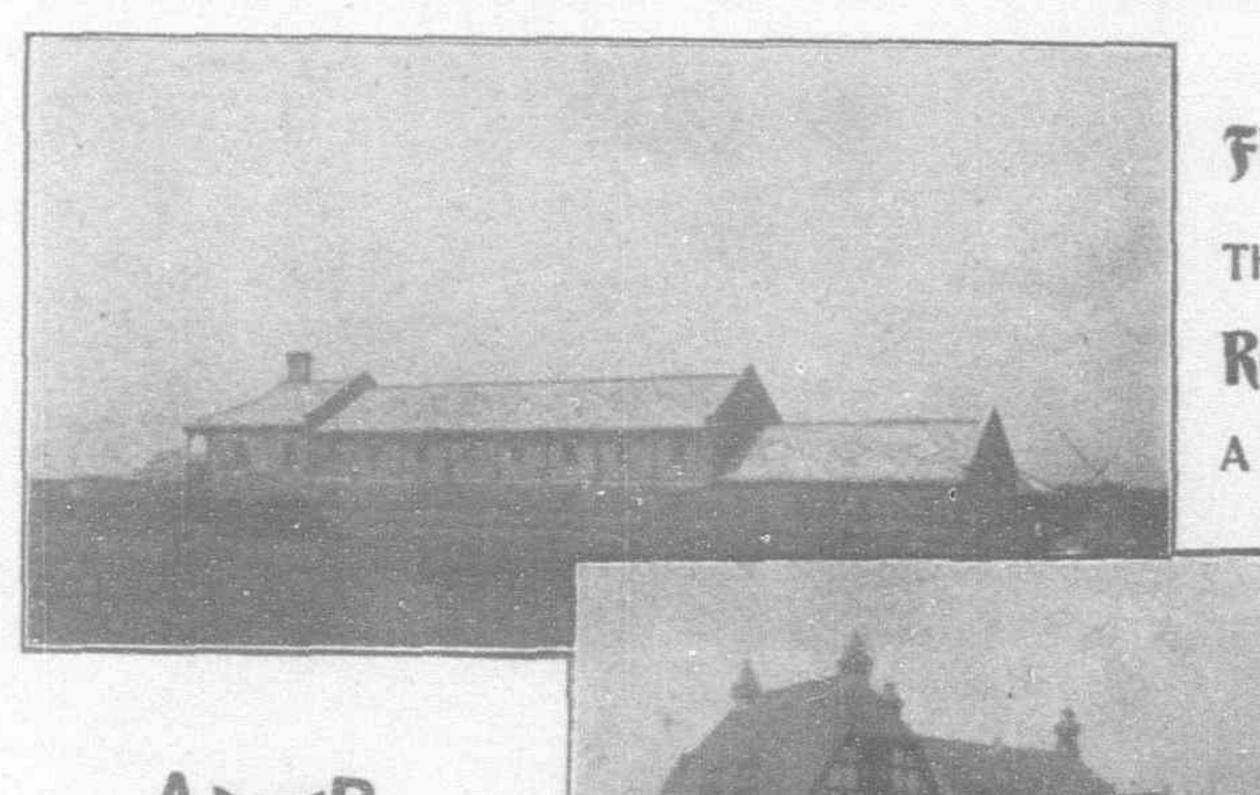
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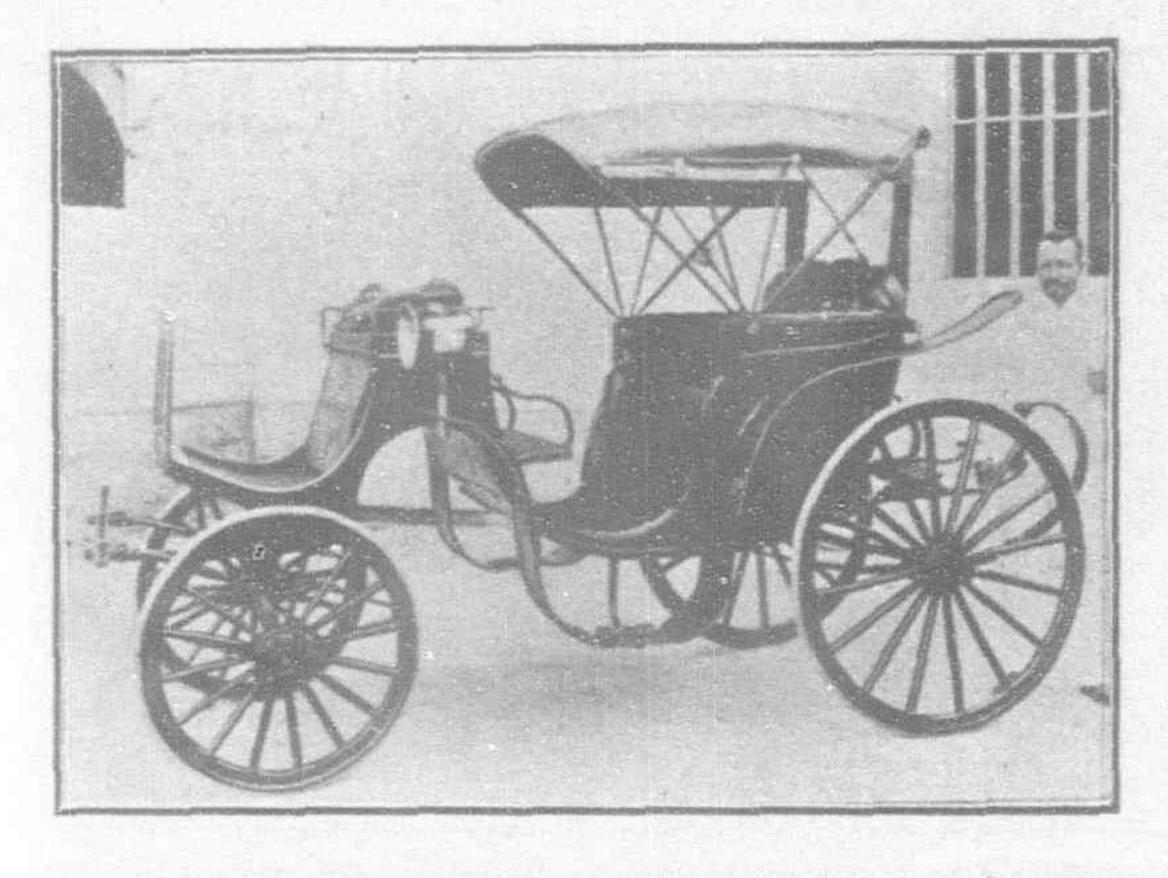
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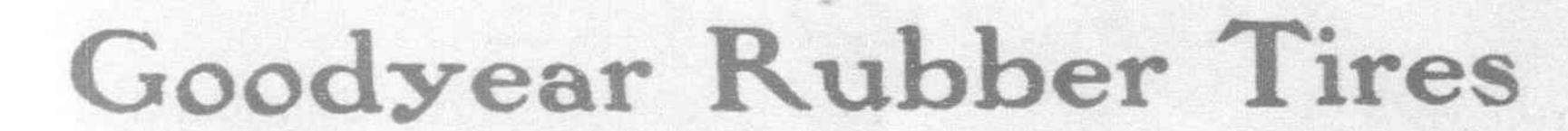
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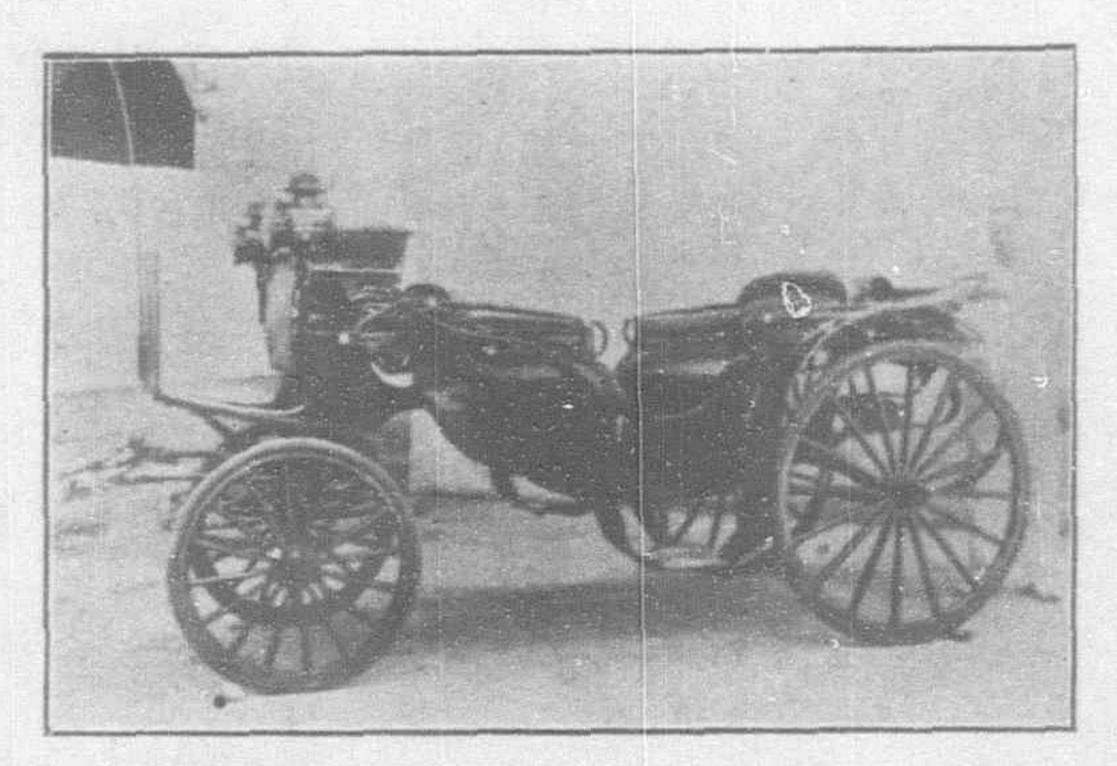
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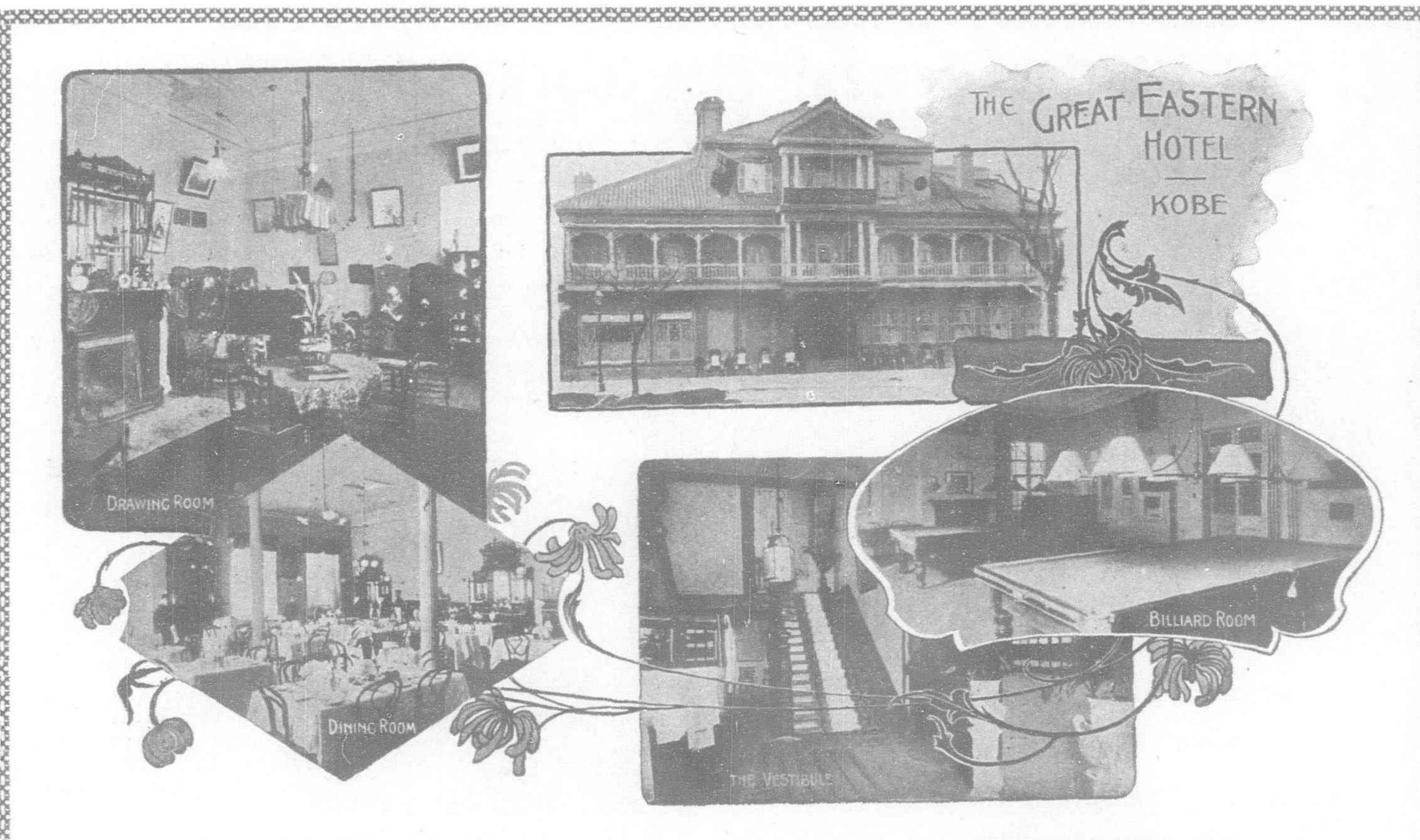
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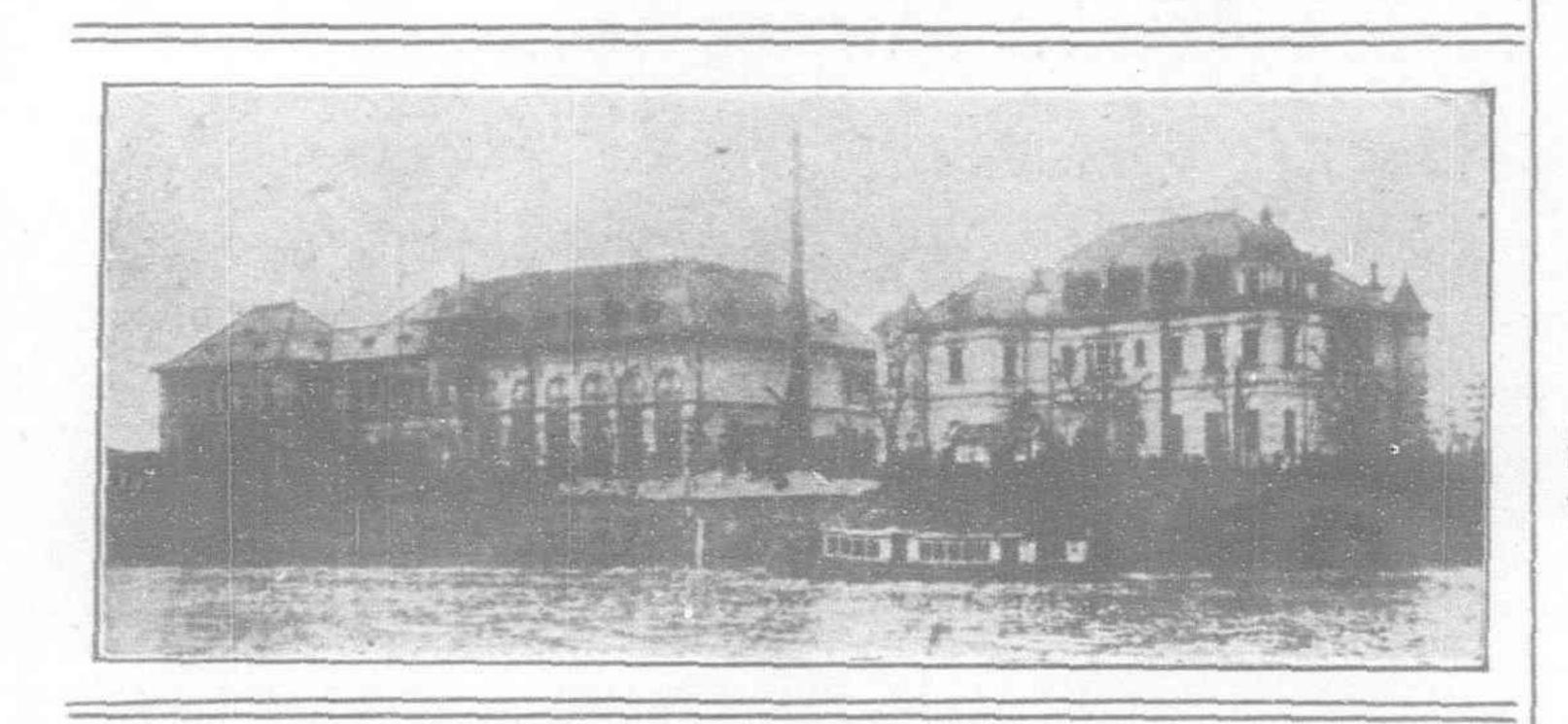






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The COMPOSITION is of great value to the Building Trade, Manufacturers and Railways; for instance, if beams, wooden structures, sleepers, telegraph poles, etc., are coated with the above COMPOSITION, they will remain in a sound condition and in a good state of preservation, as they will not be attacked by wood destroying insects.

It is also advisable for every household in tropical climates to keep the above COMPOSITION for daily use, in order to destroy white ants and dry rot which are a source of great trouble to every household.

The principal actions of the composi-

TION on wood are as follows:

The oily substances are easily soaked into the wood and will not only destroy the white ants and other wood destroying insects that are actually there, but will pre-

vent others from attacking wood so coated.

It has a preserving and disinfecting action on the wood and protects the same from decay and dry rot.

APPLICATION:—The application is extremely simple and may be performed by any unskilled laborer. Take COMPOSITION and coat wood with a brush. It is advisable to coat wood a second time.

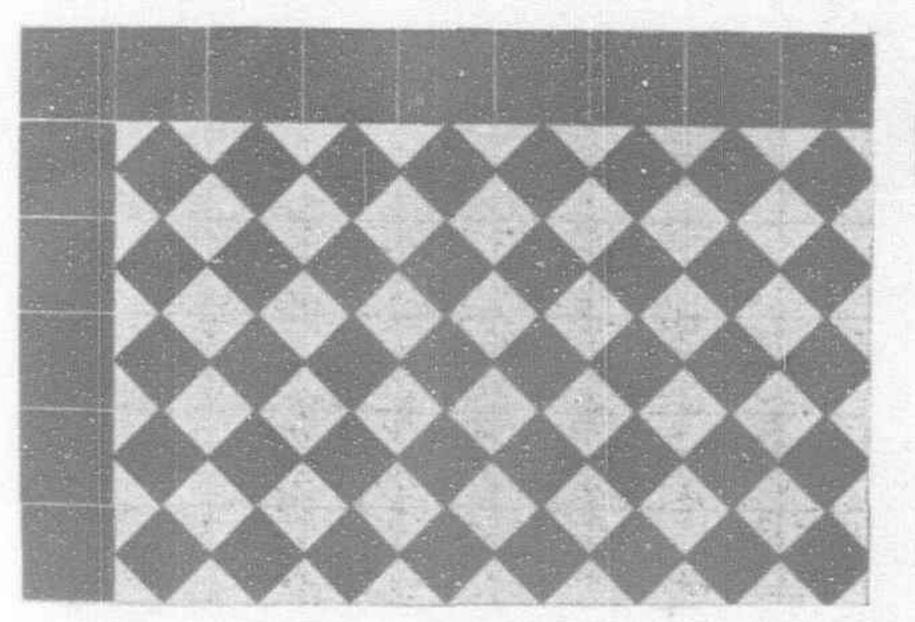
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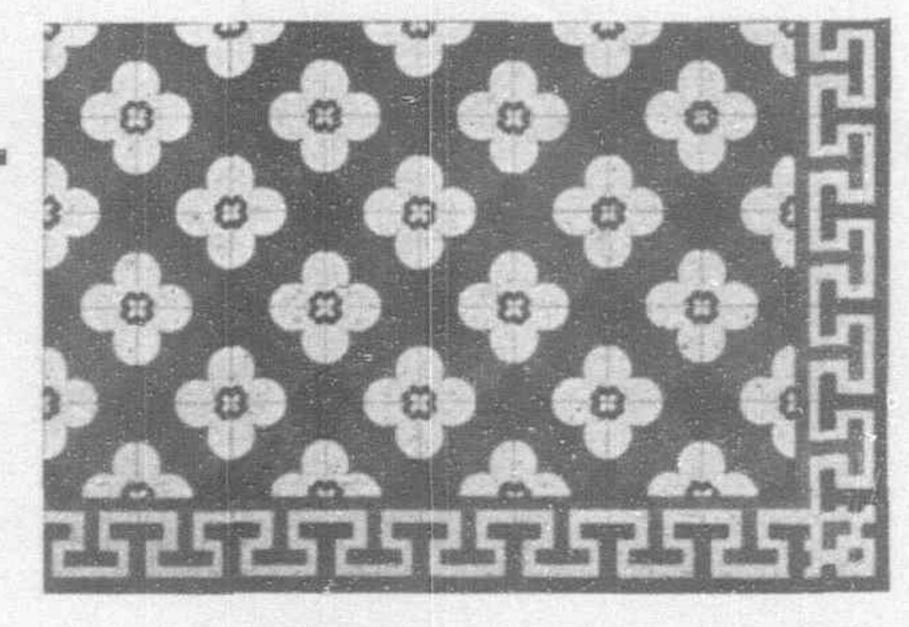
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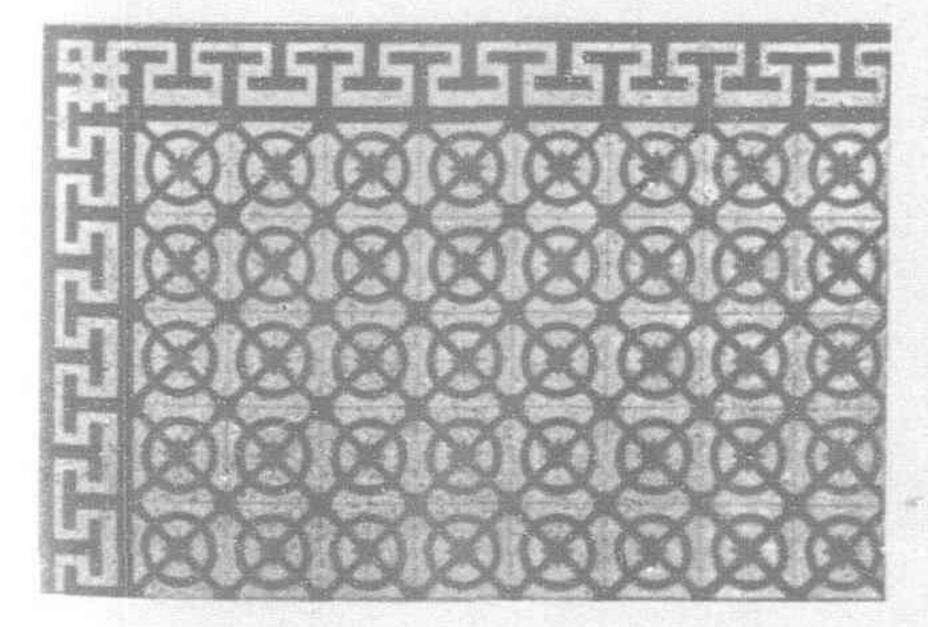
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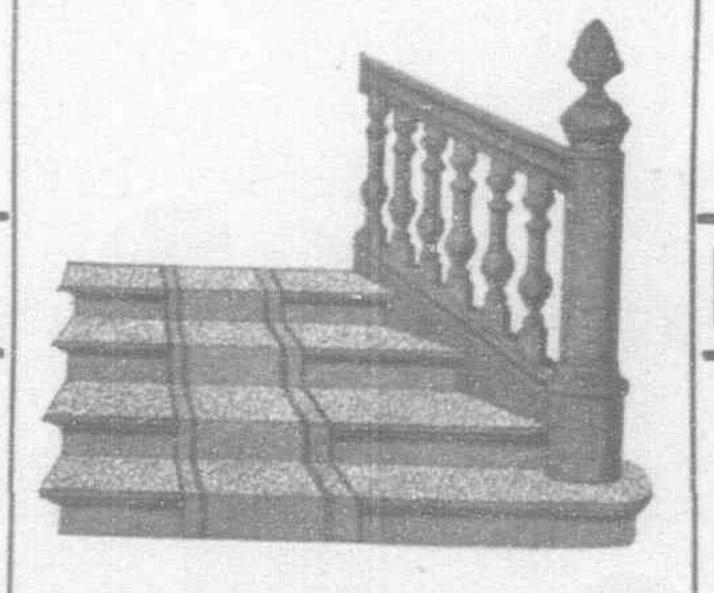
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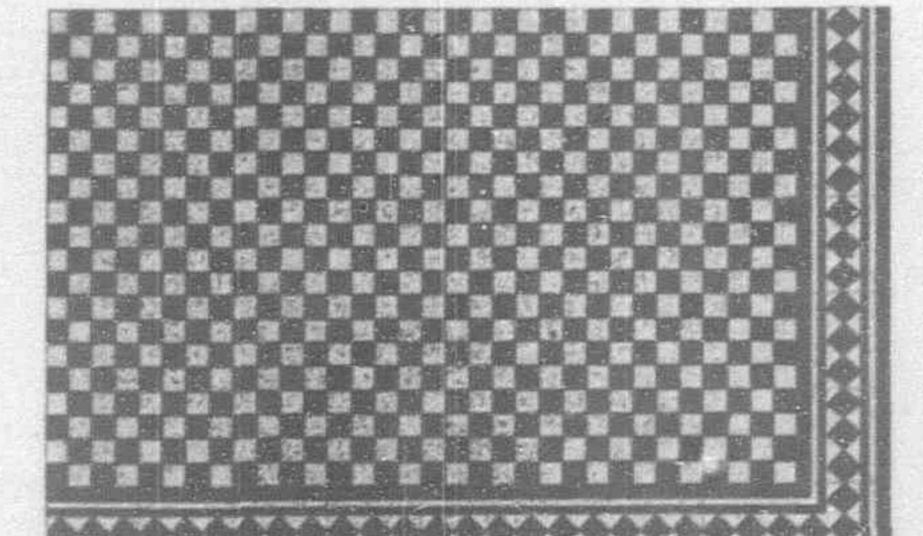




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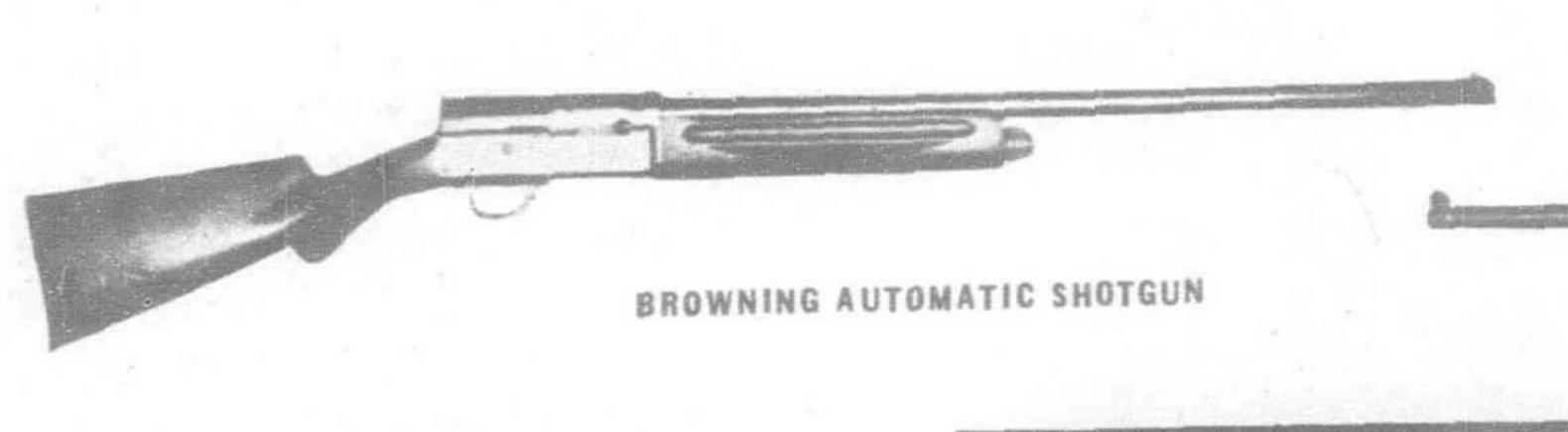




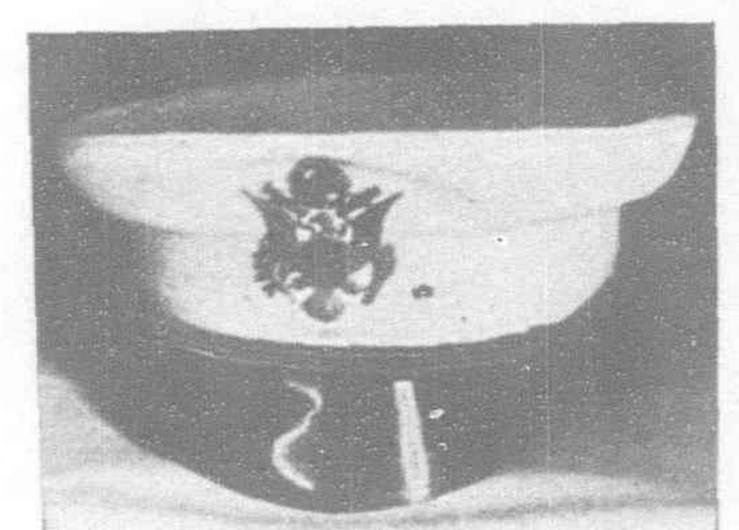
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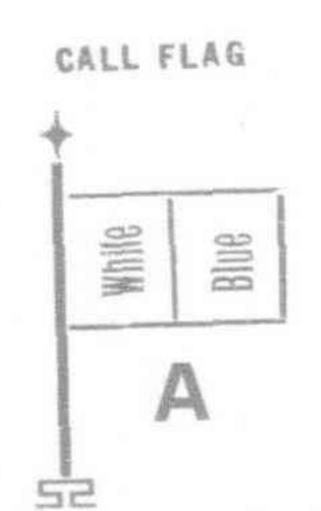
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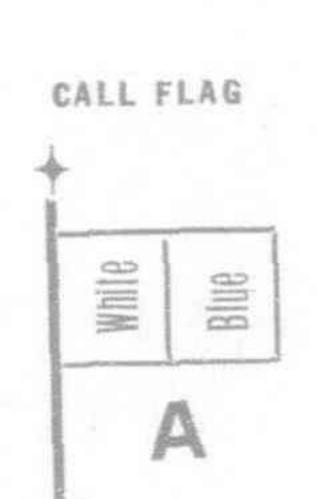
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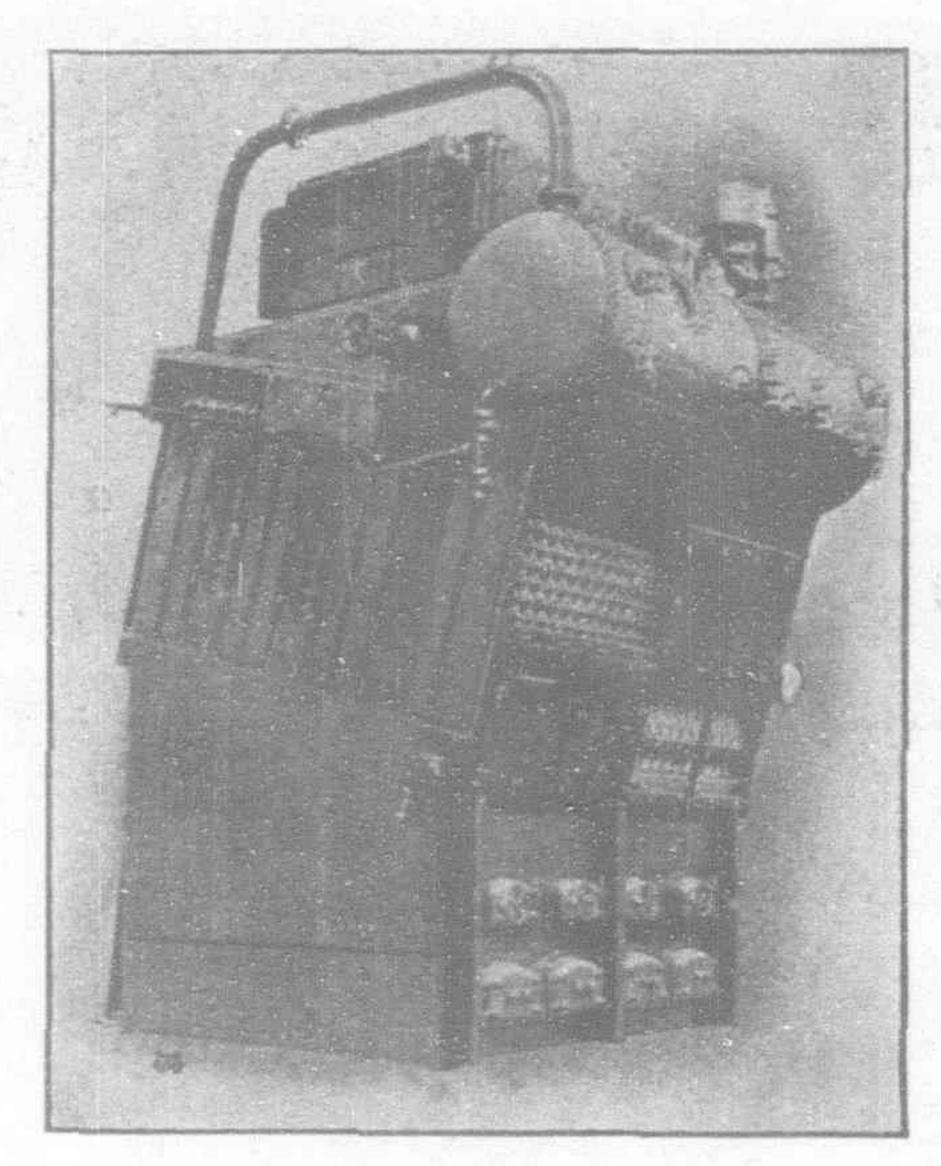
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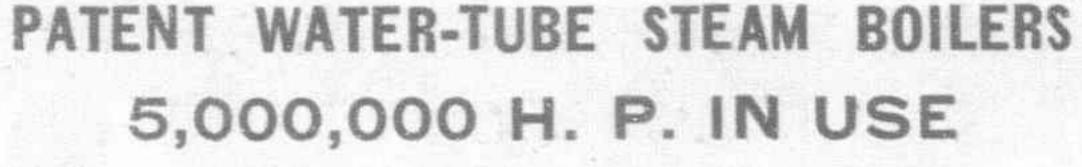
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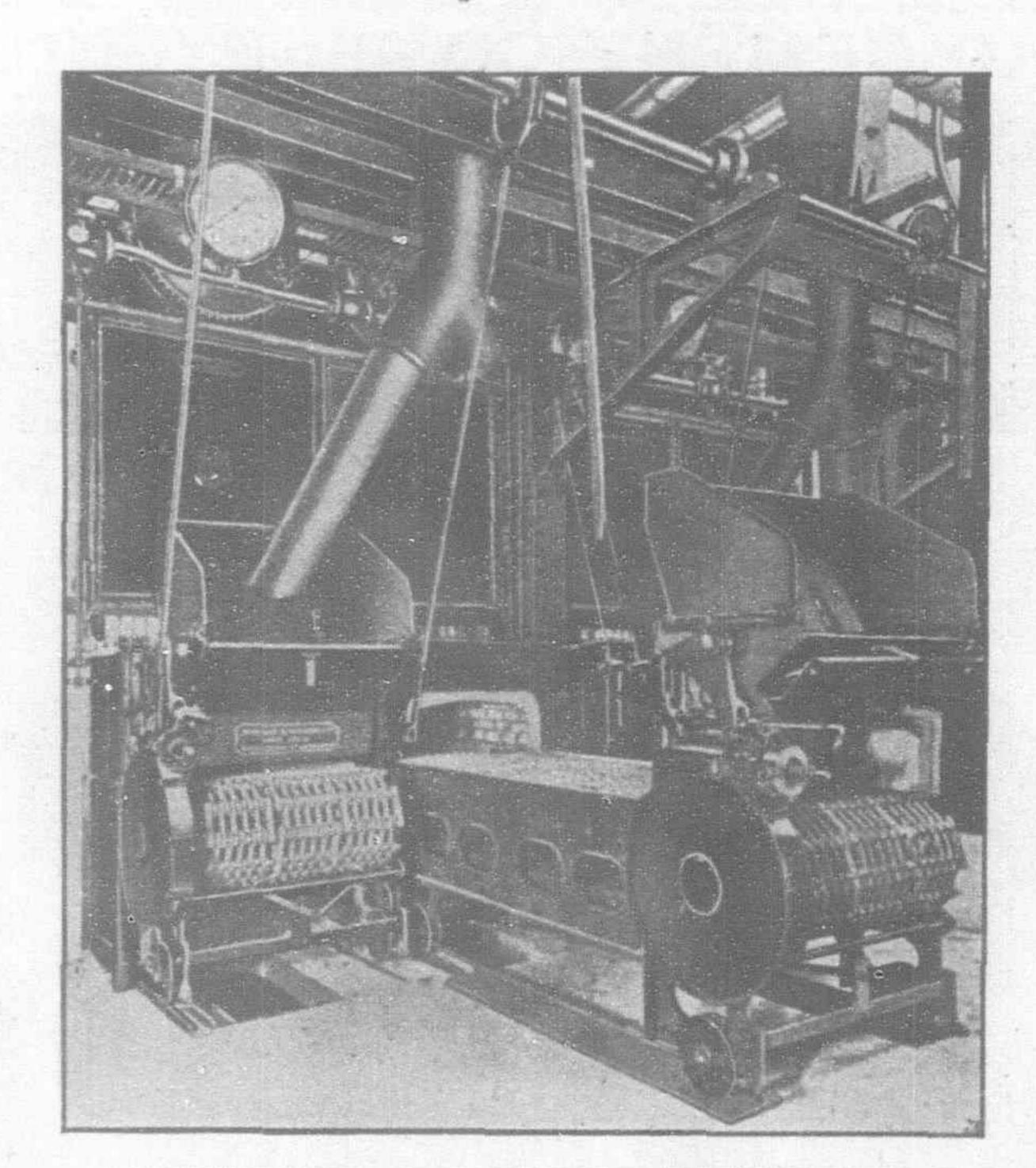


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kong.

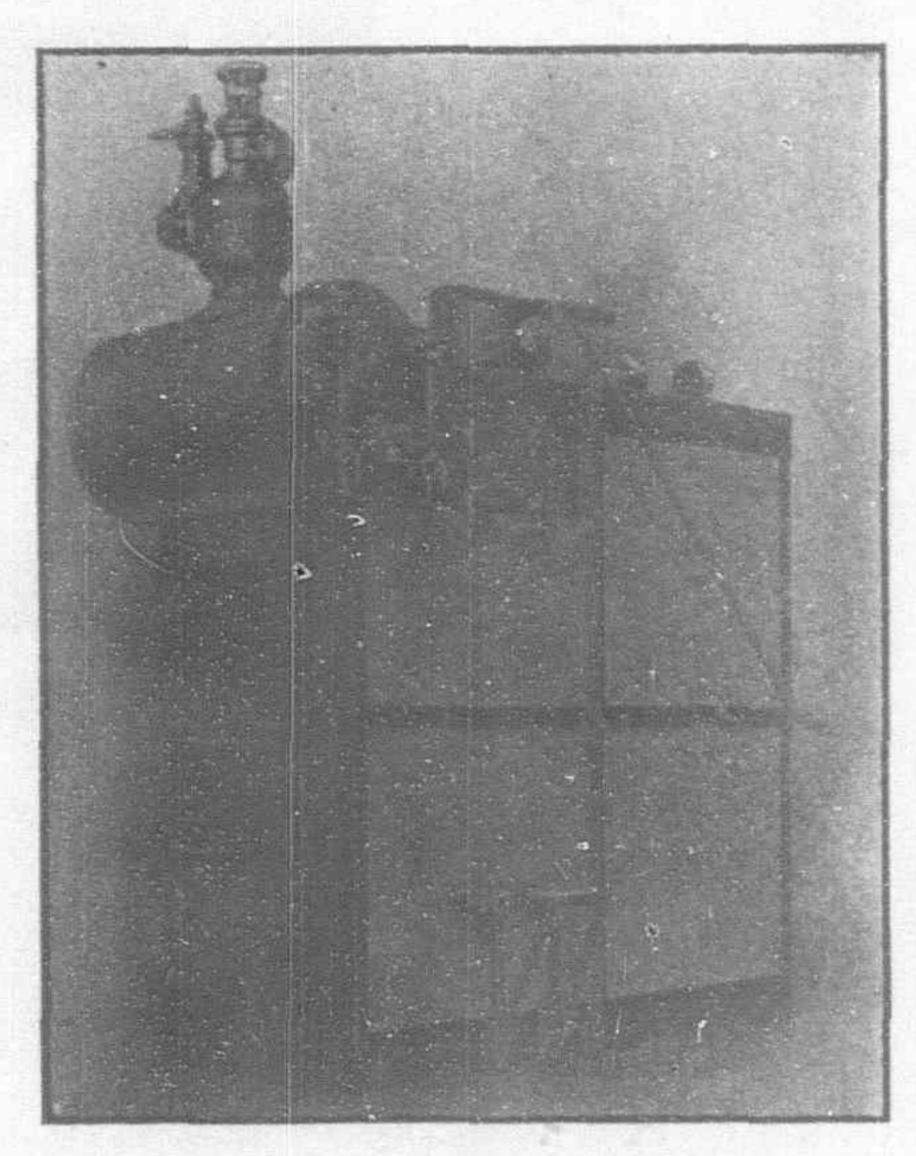
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Patent Portable Boilers

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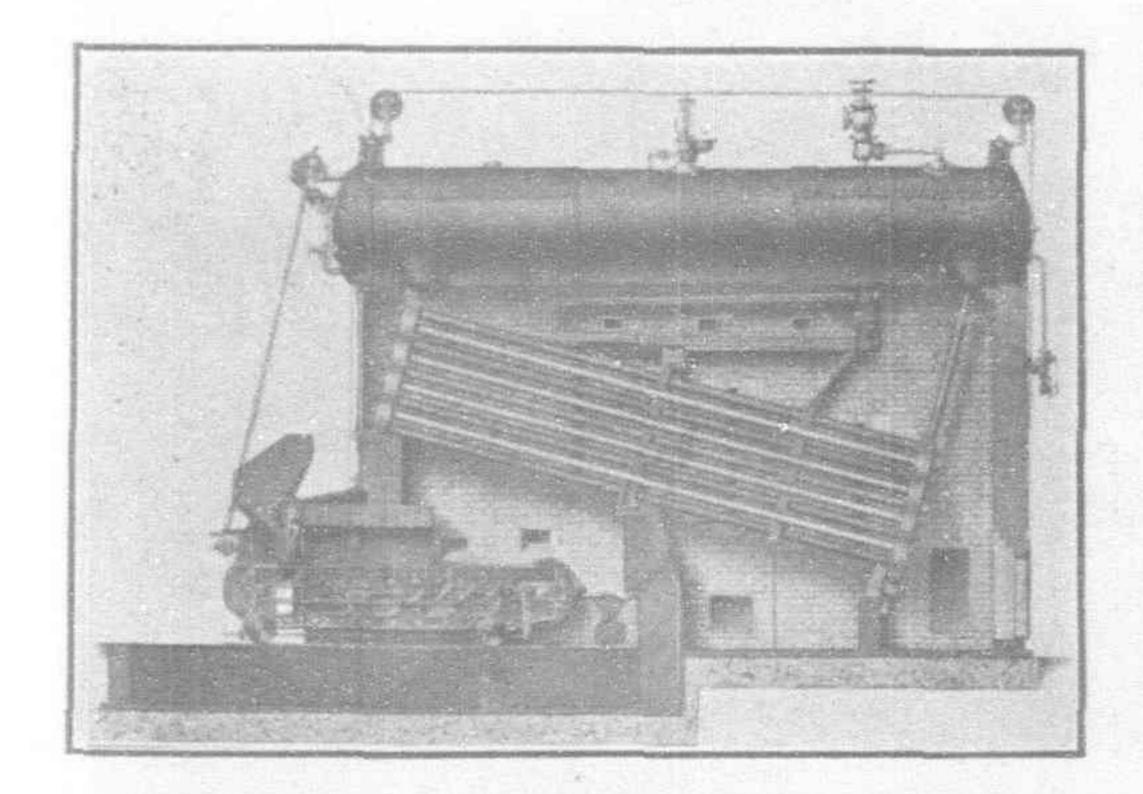
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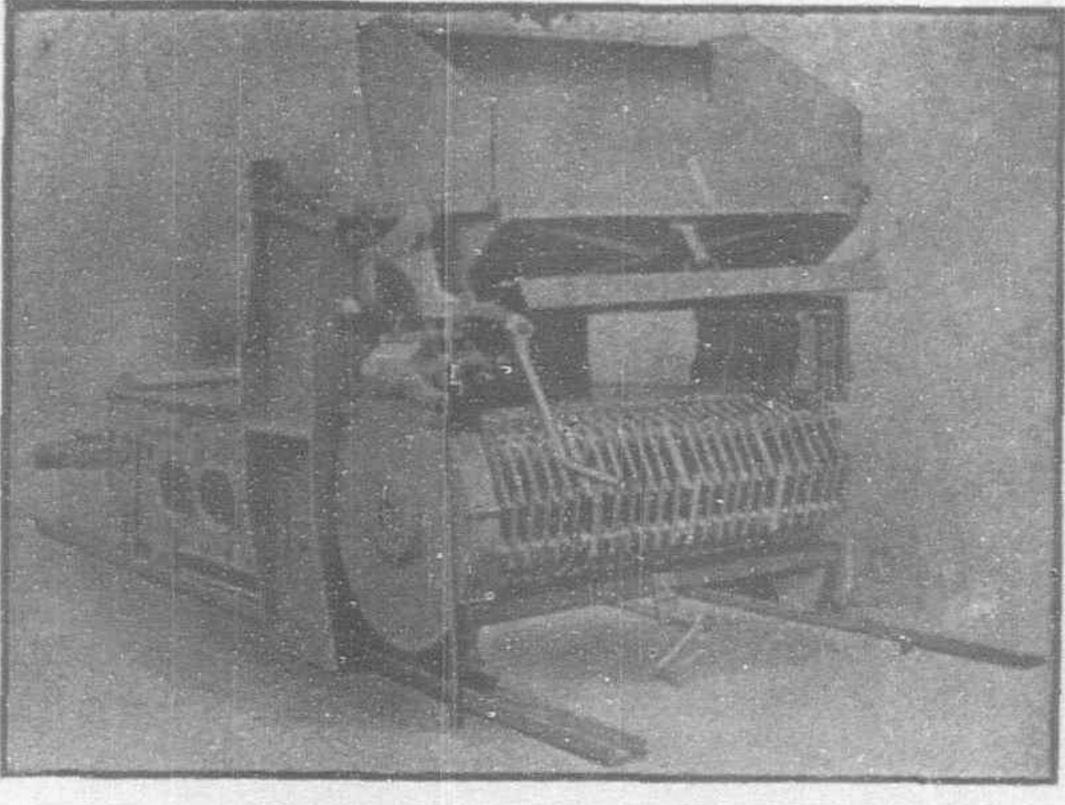
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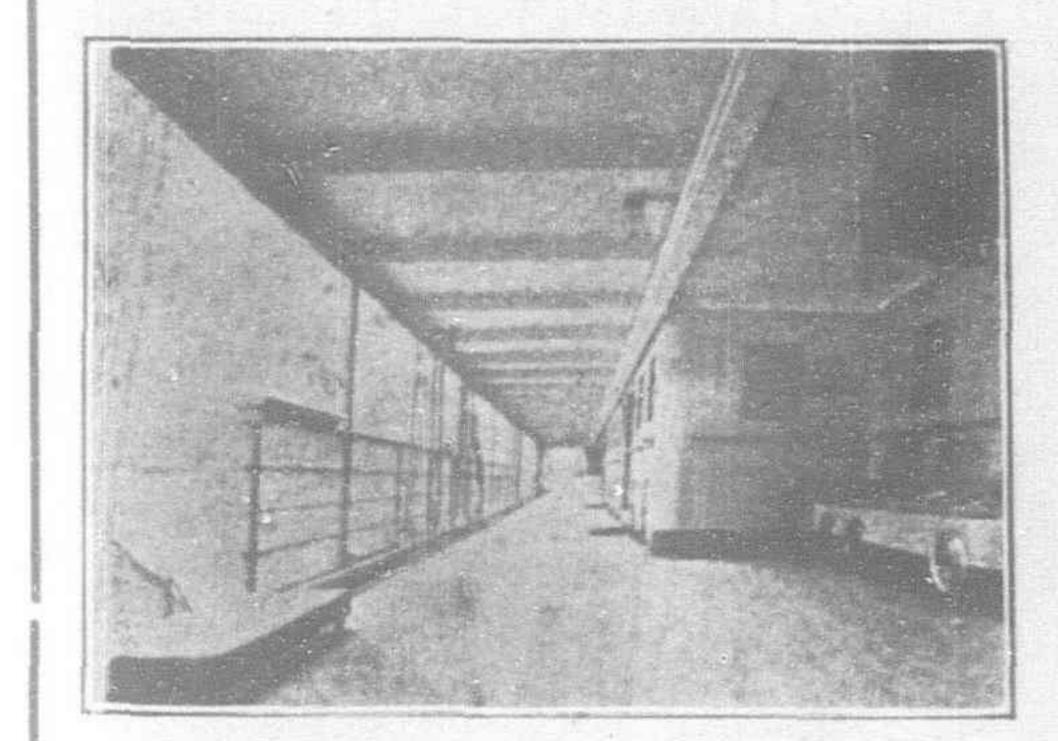
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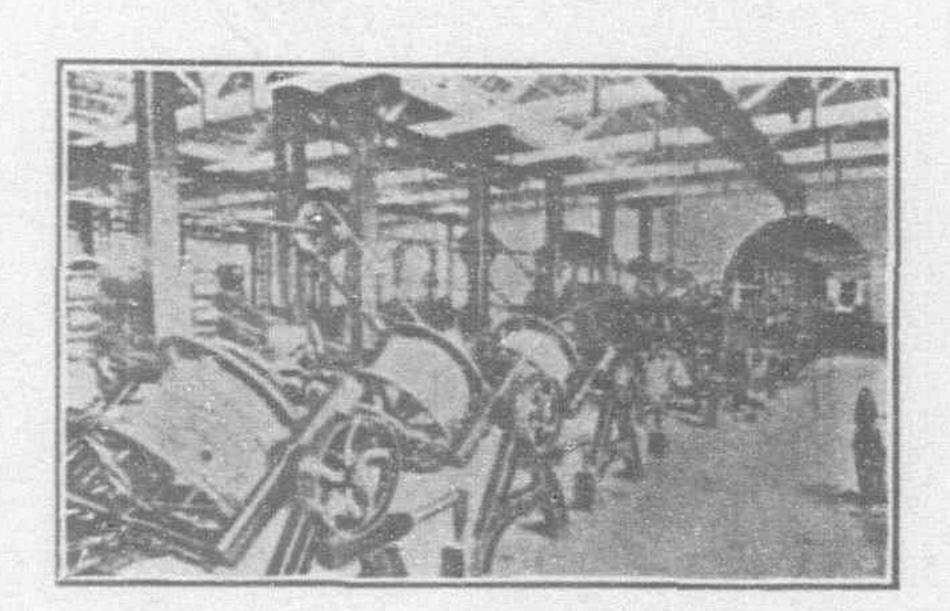
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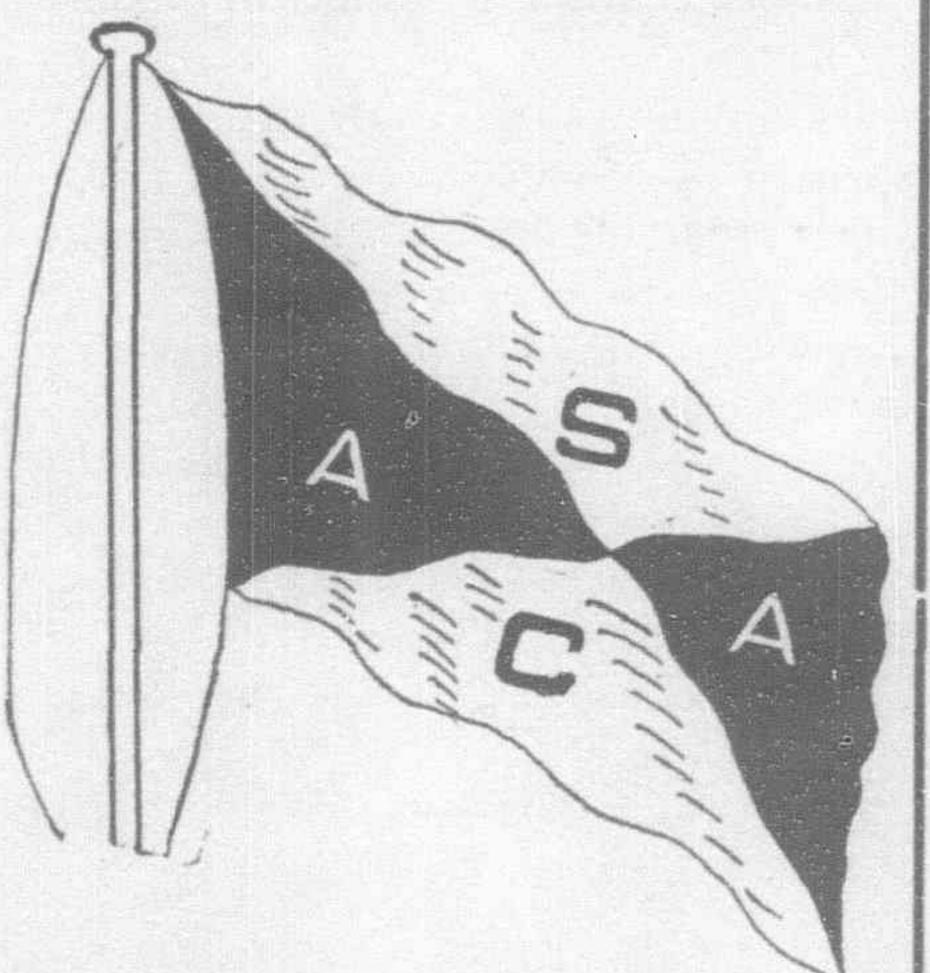
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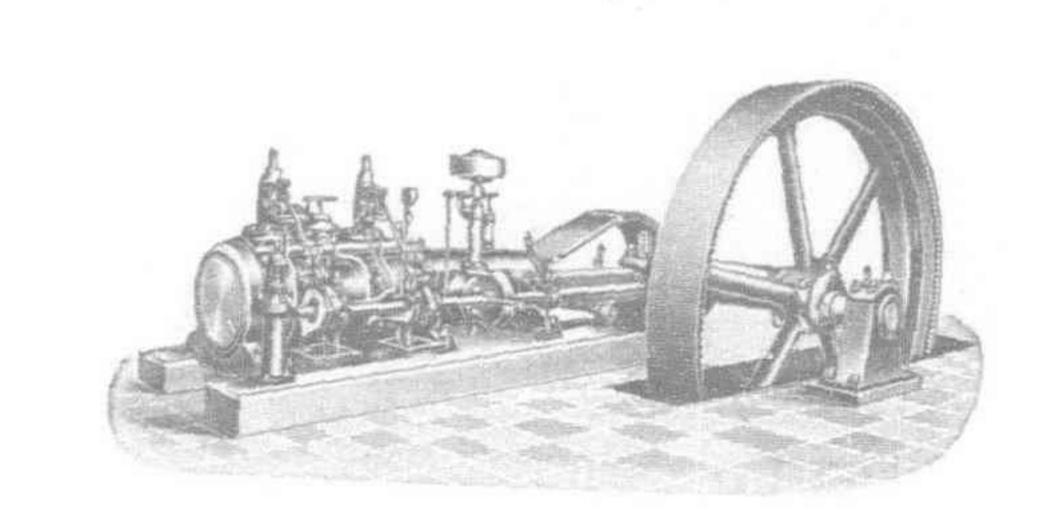
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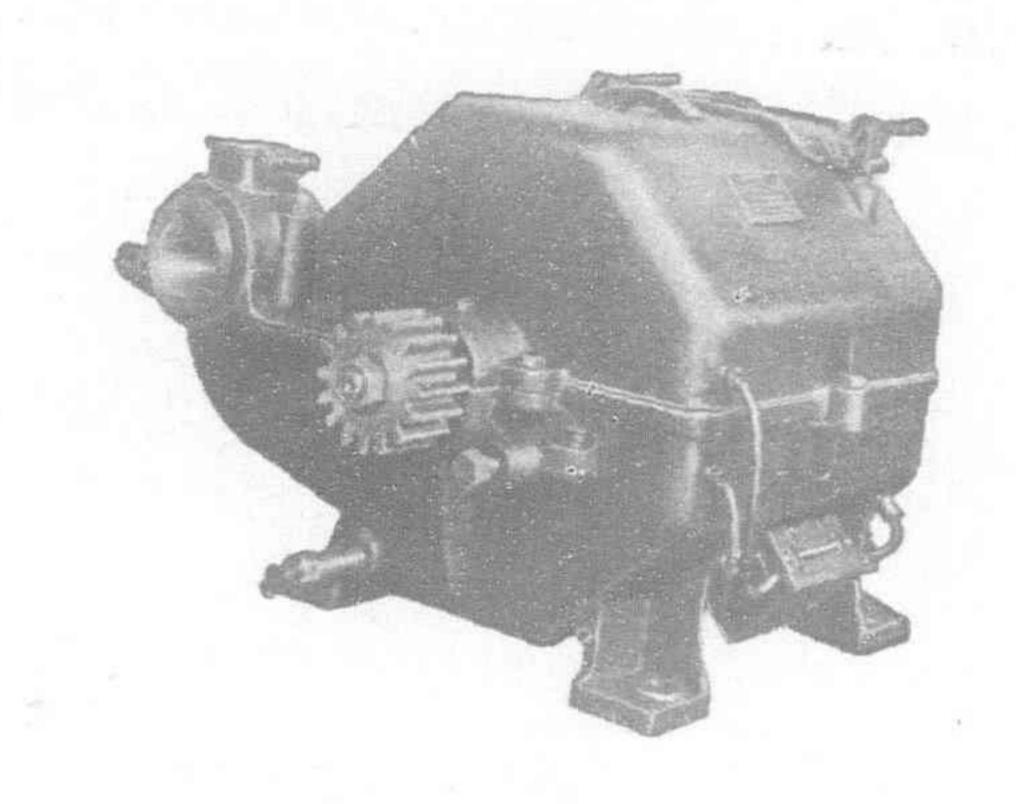
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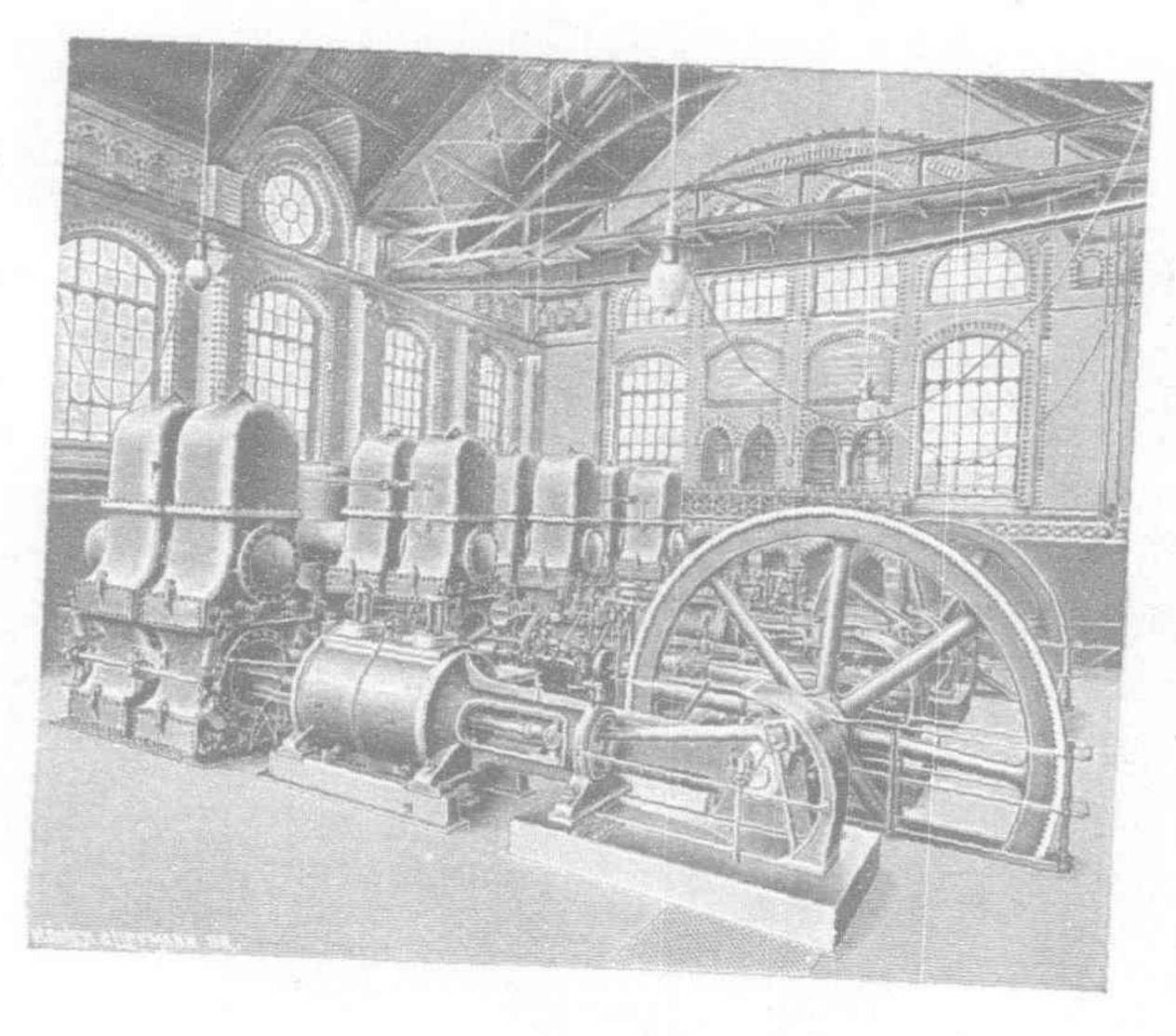
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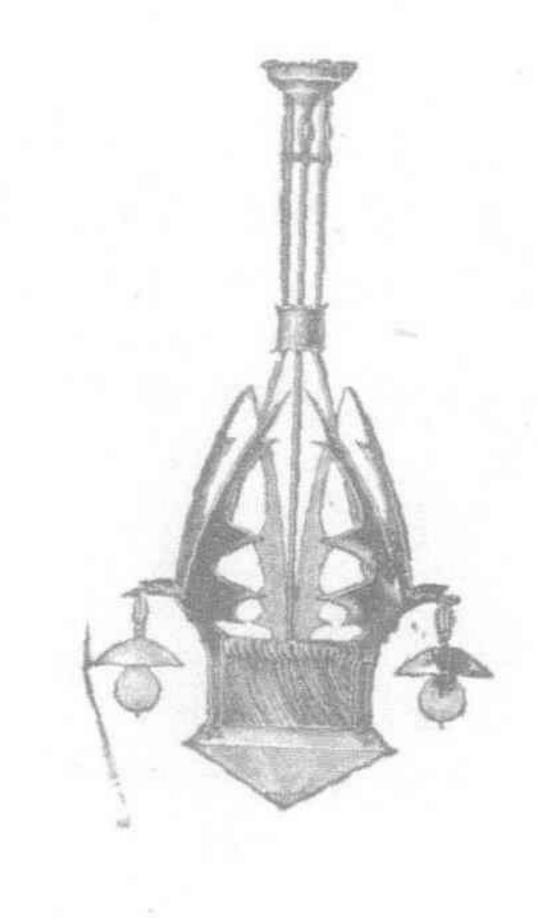
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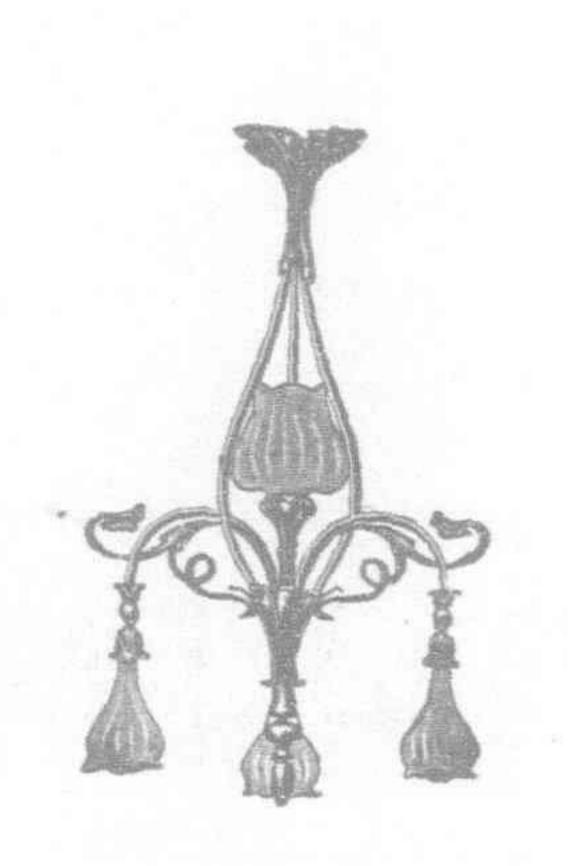
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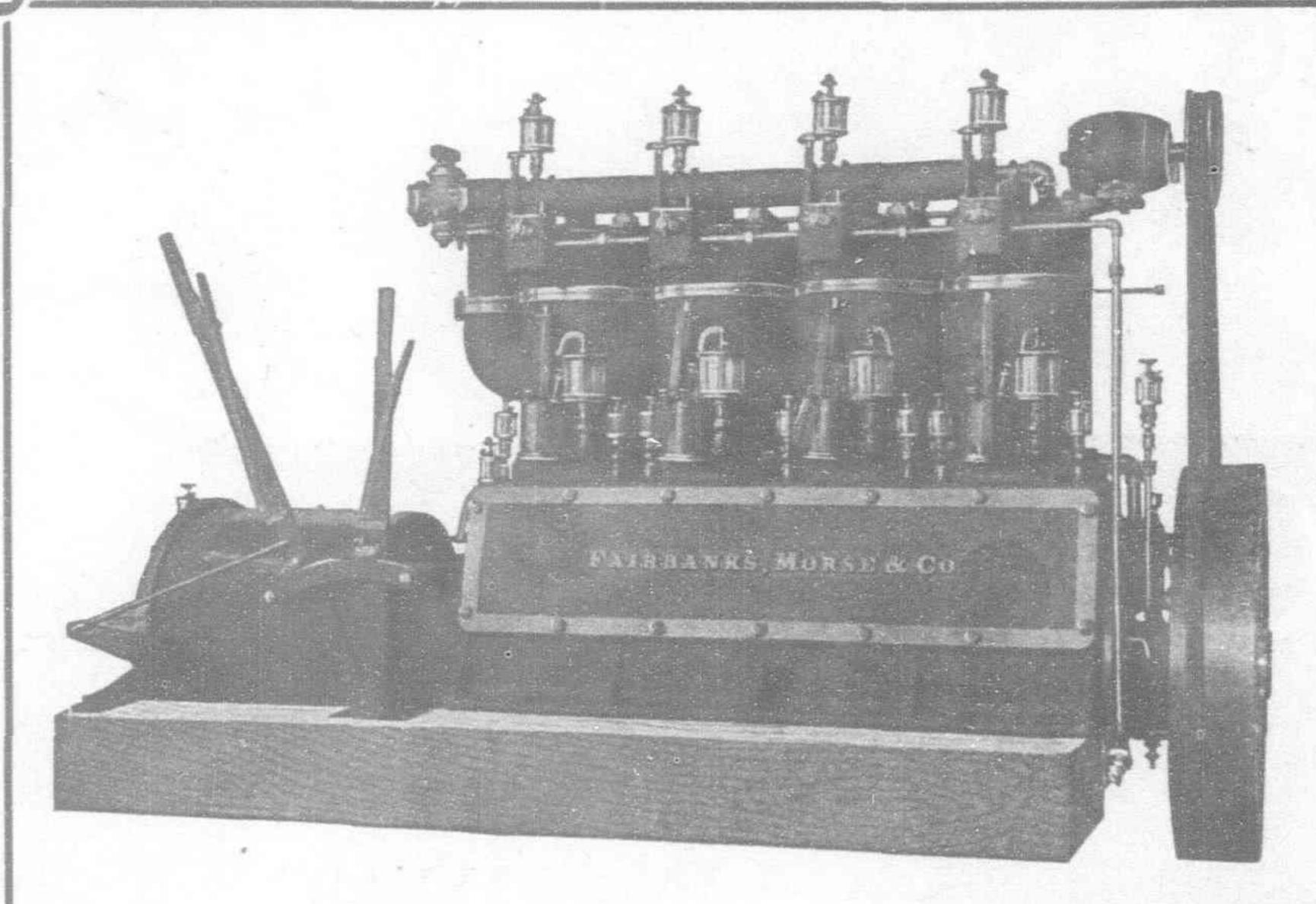




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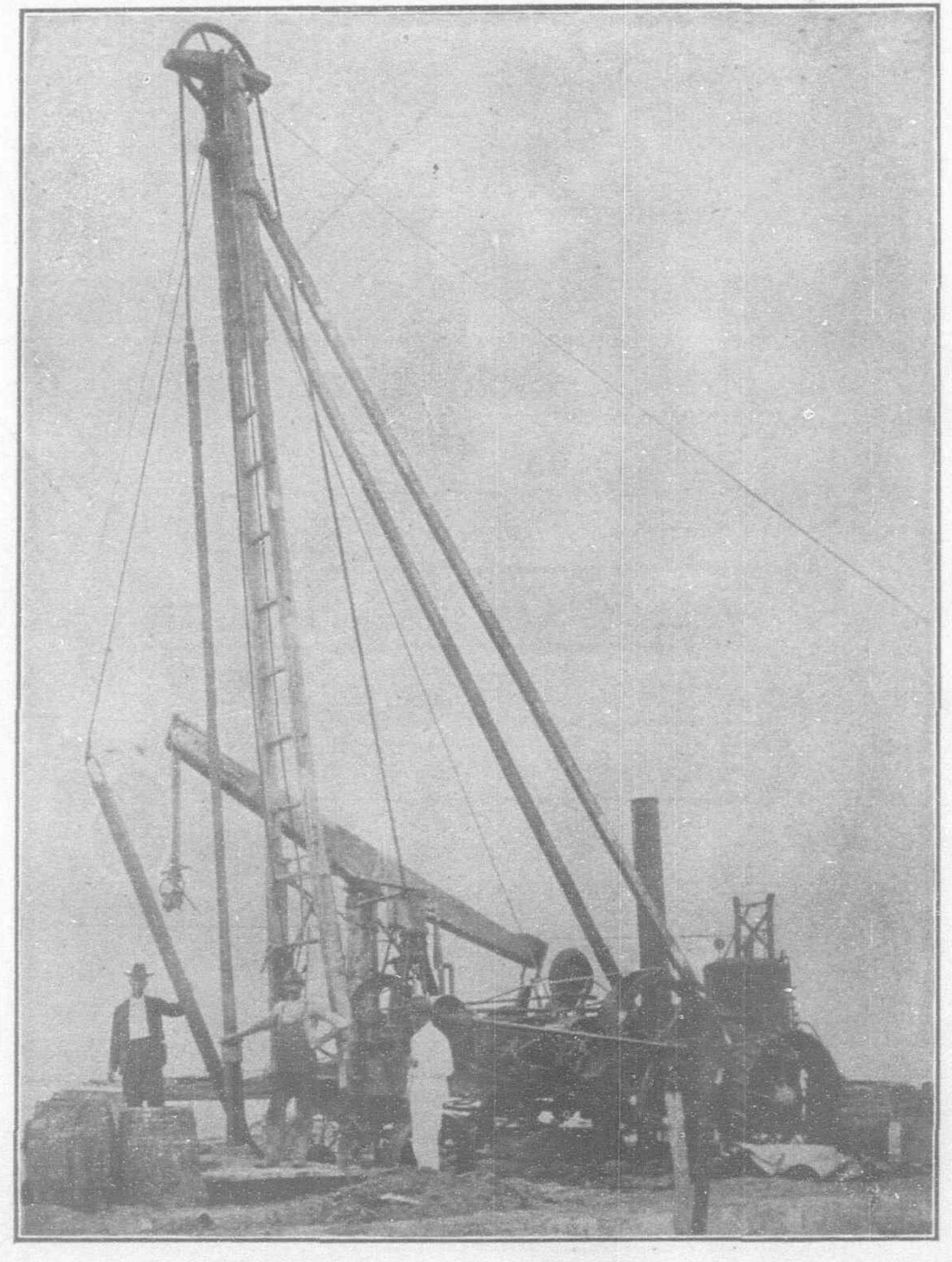
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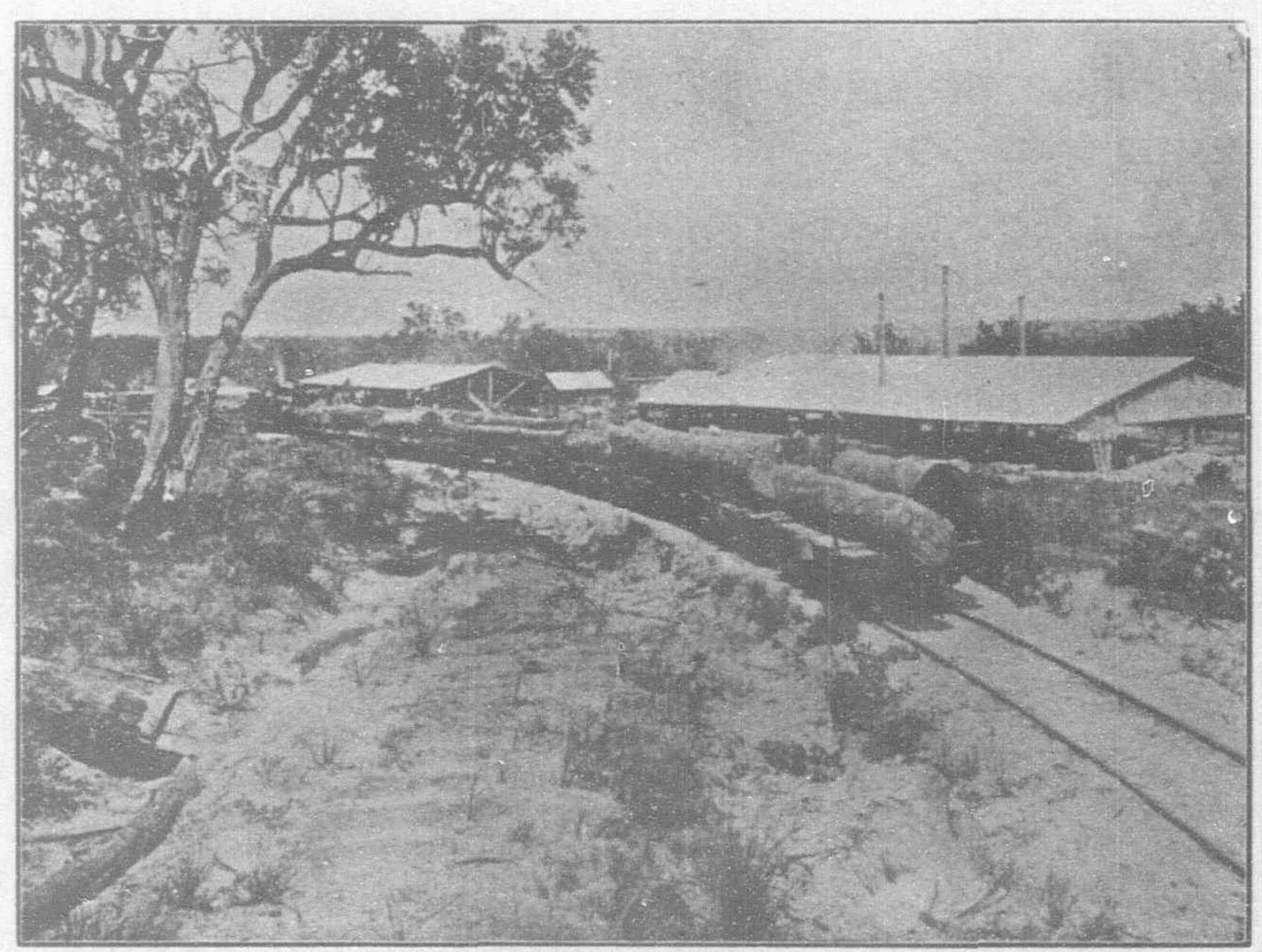
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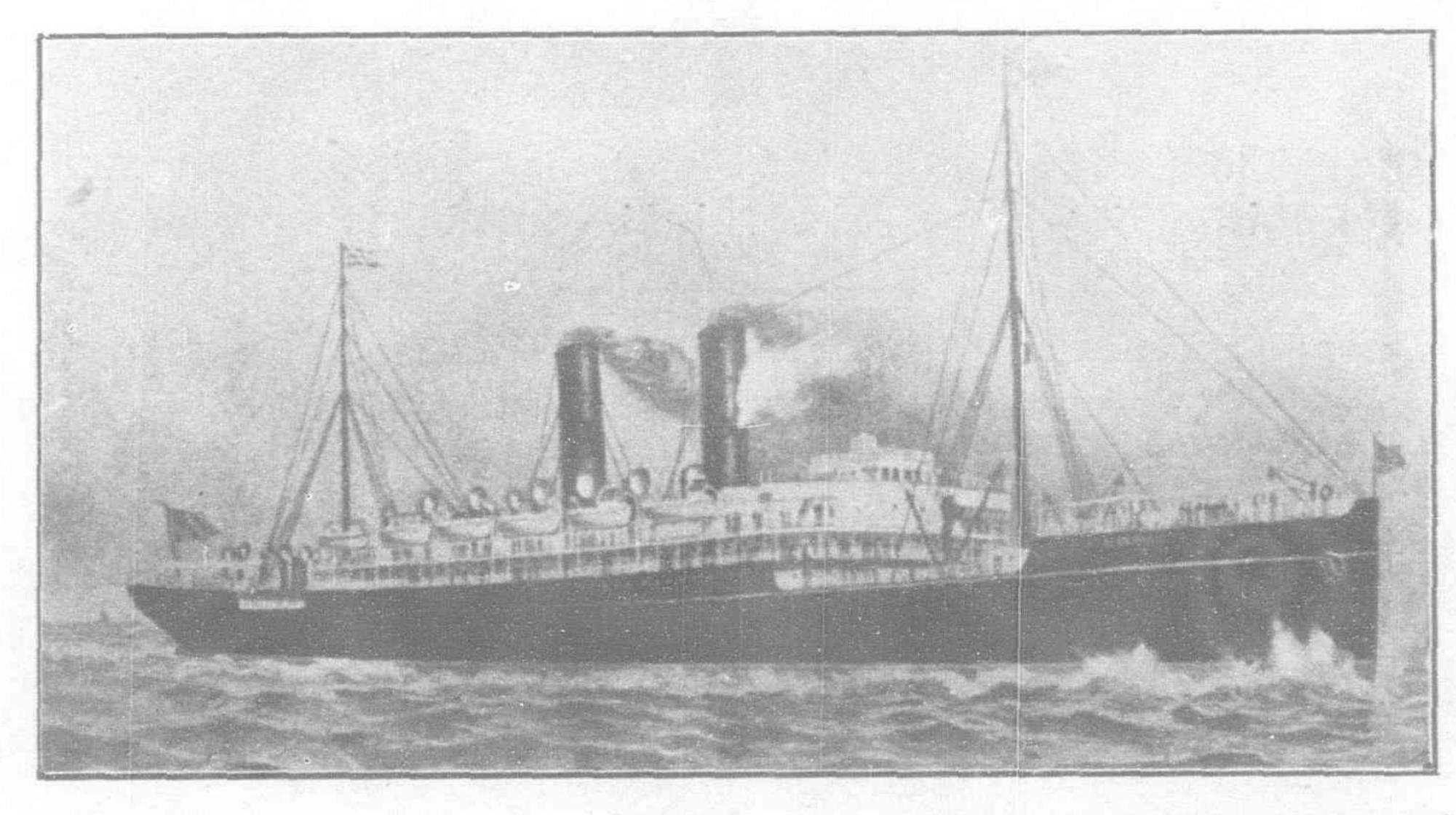
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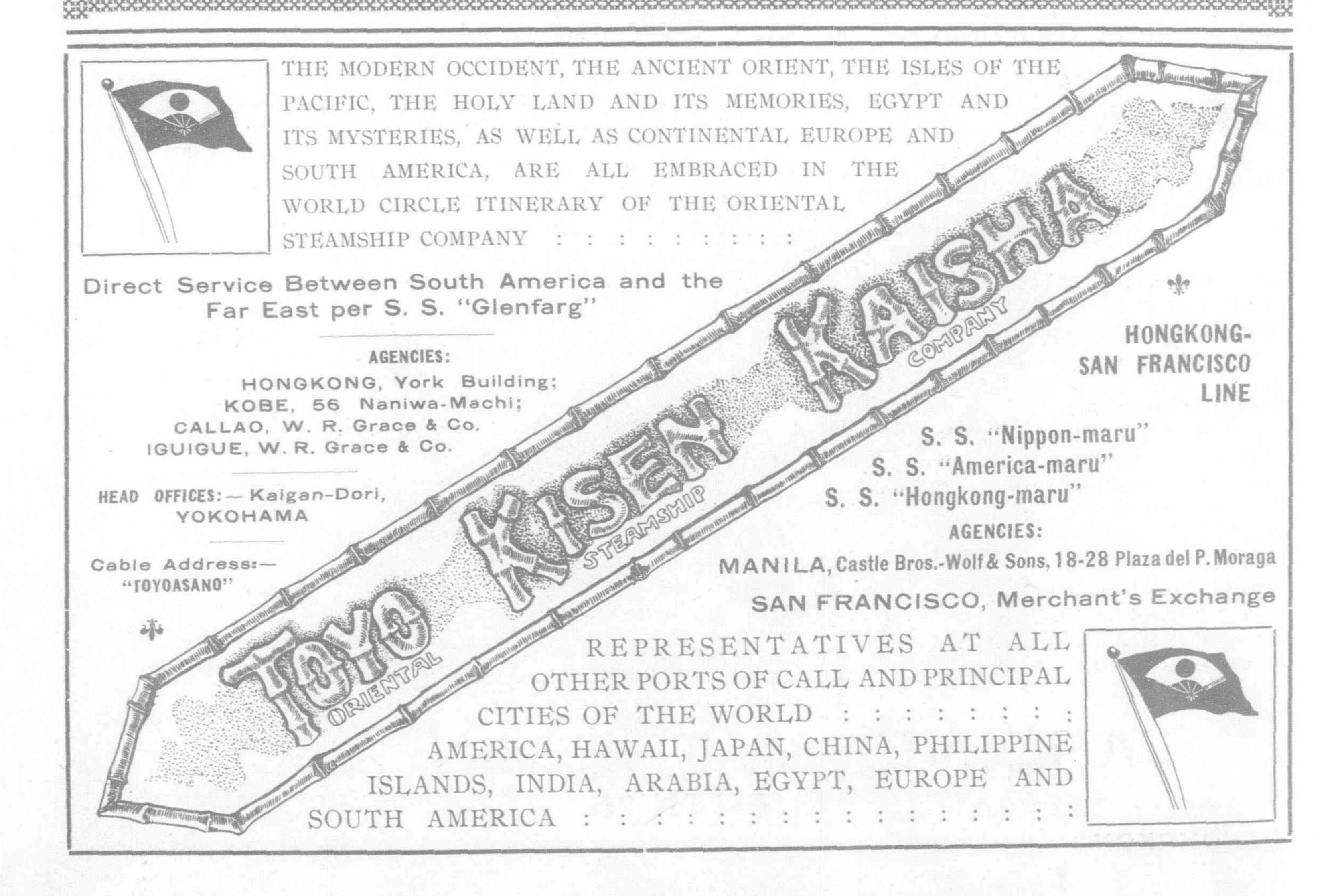
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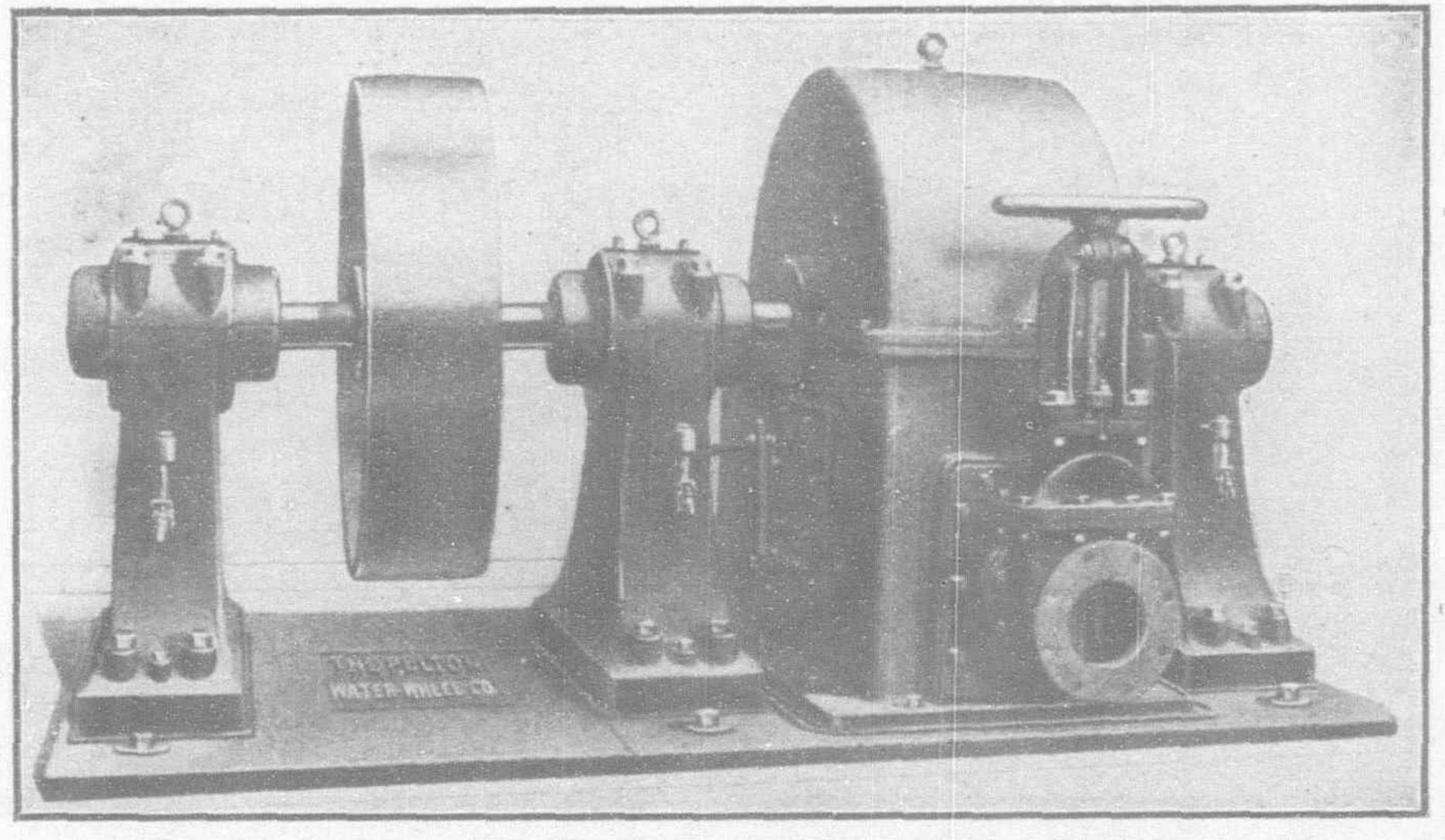
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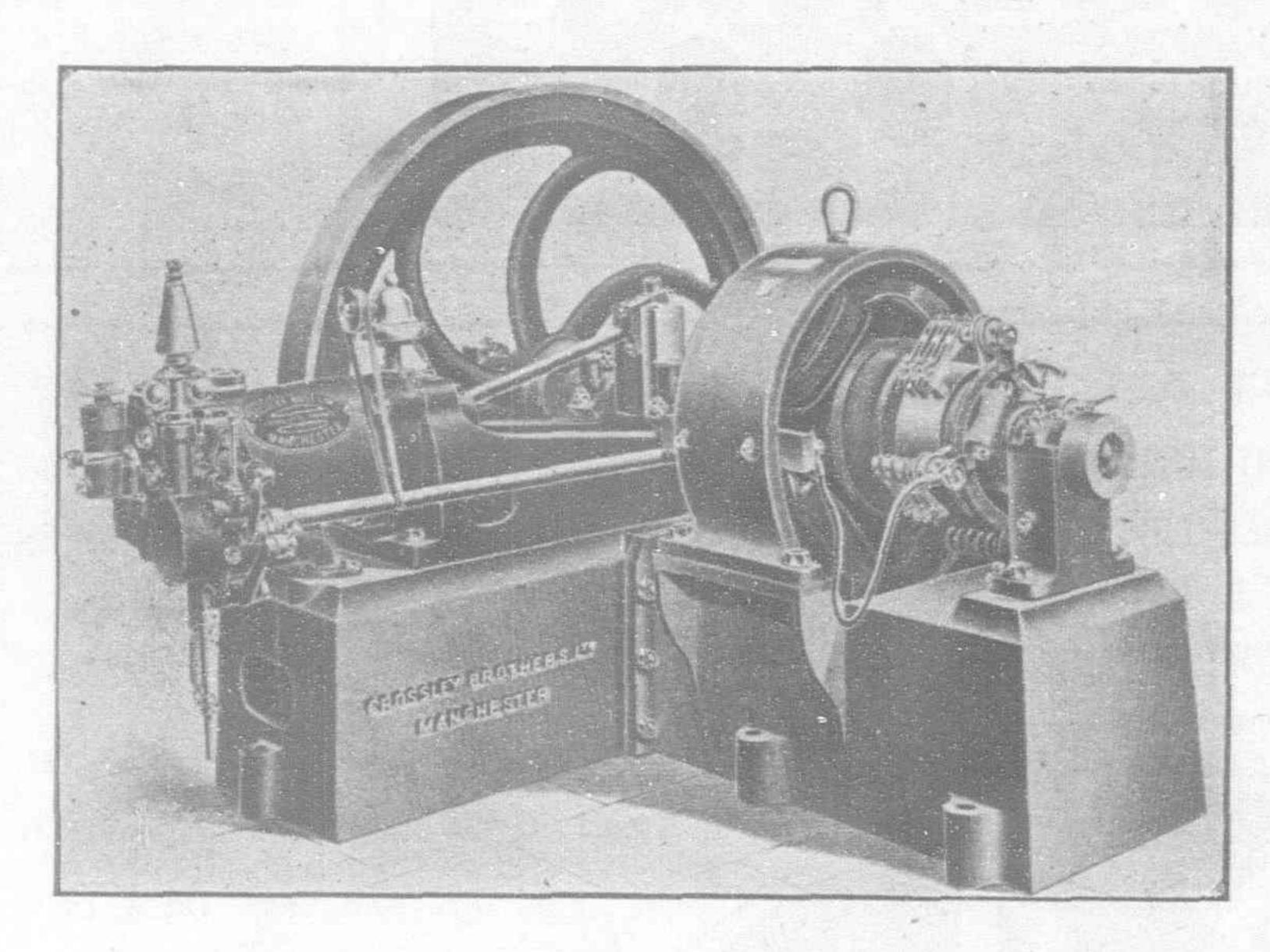
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TIDAL SLIPWAY AND HAS AN

EXTREME LENGTH OF 360 FT.,

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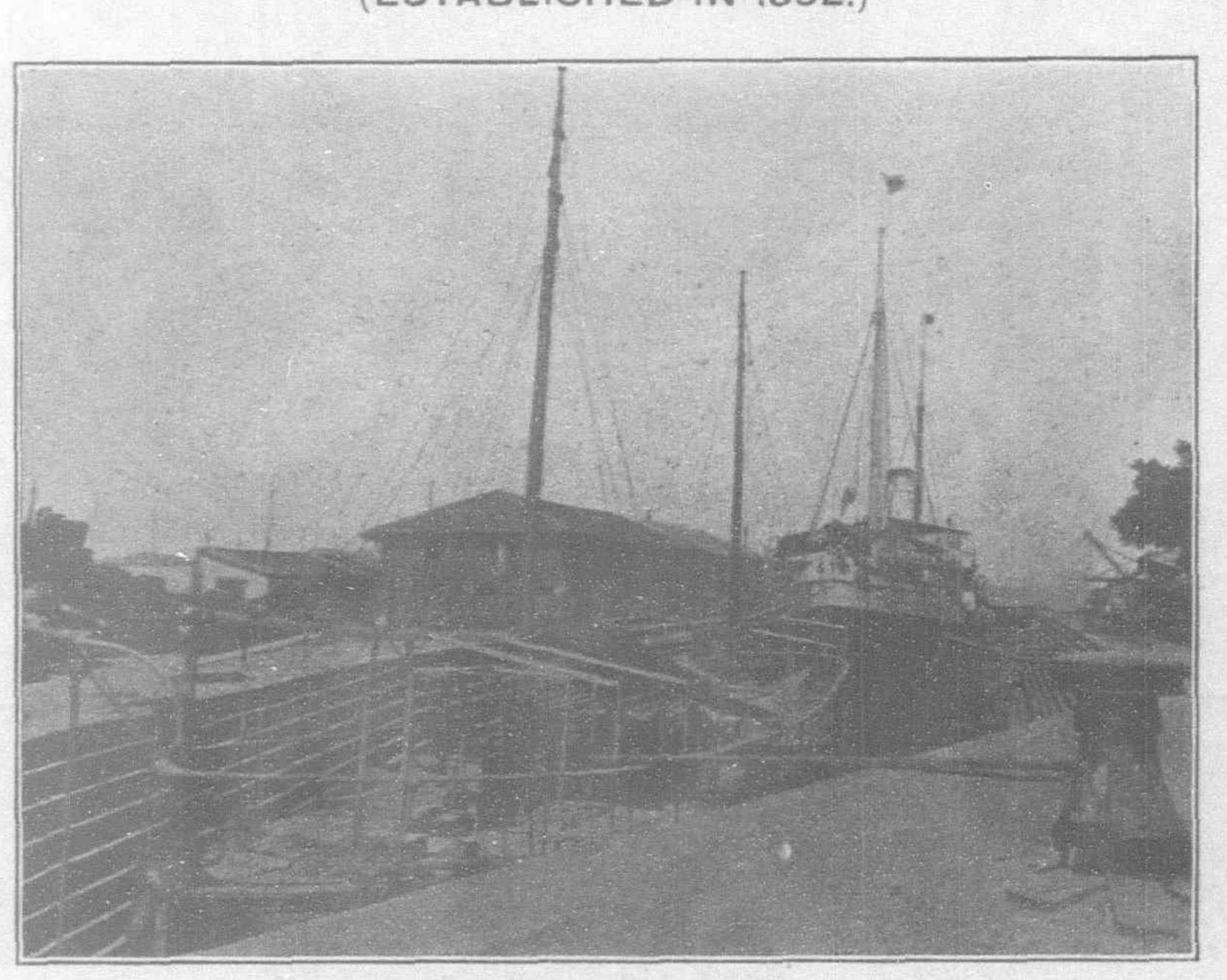
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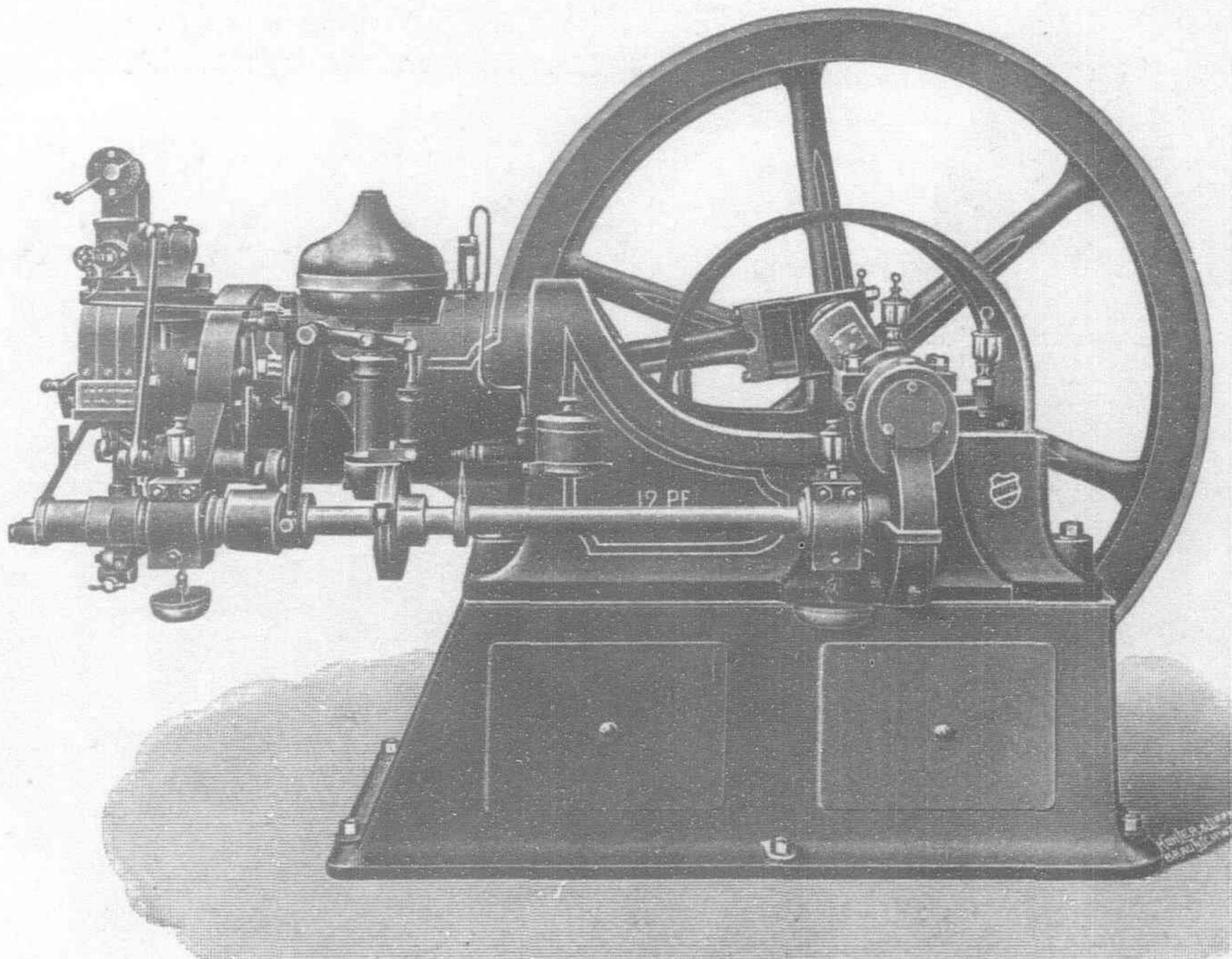
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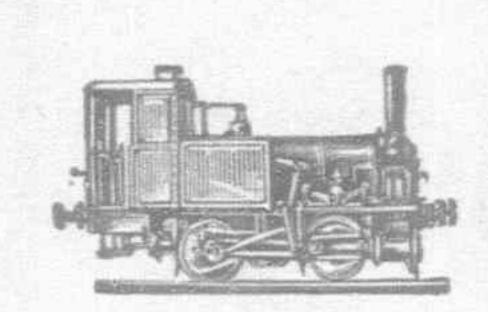
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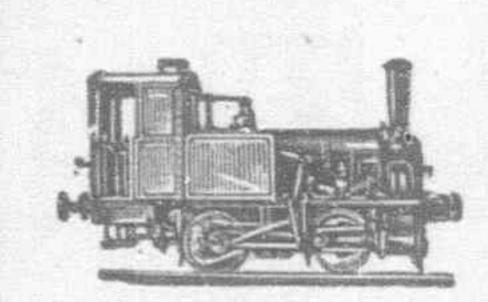
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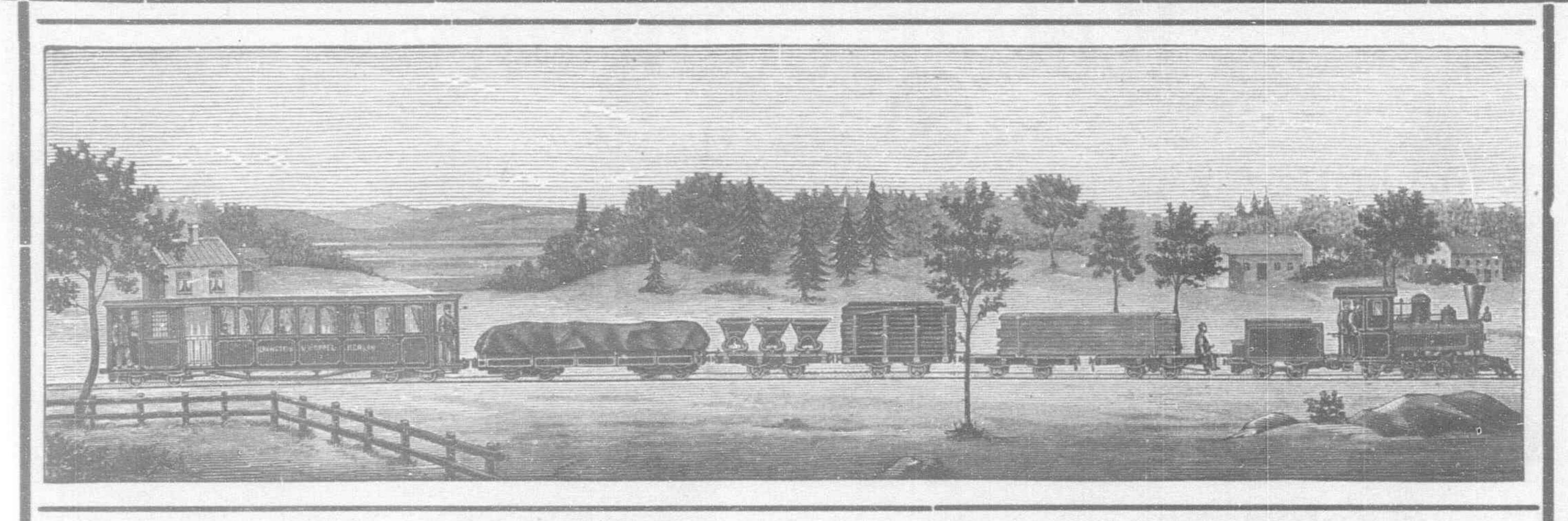




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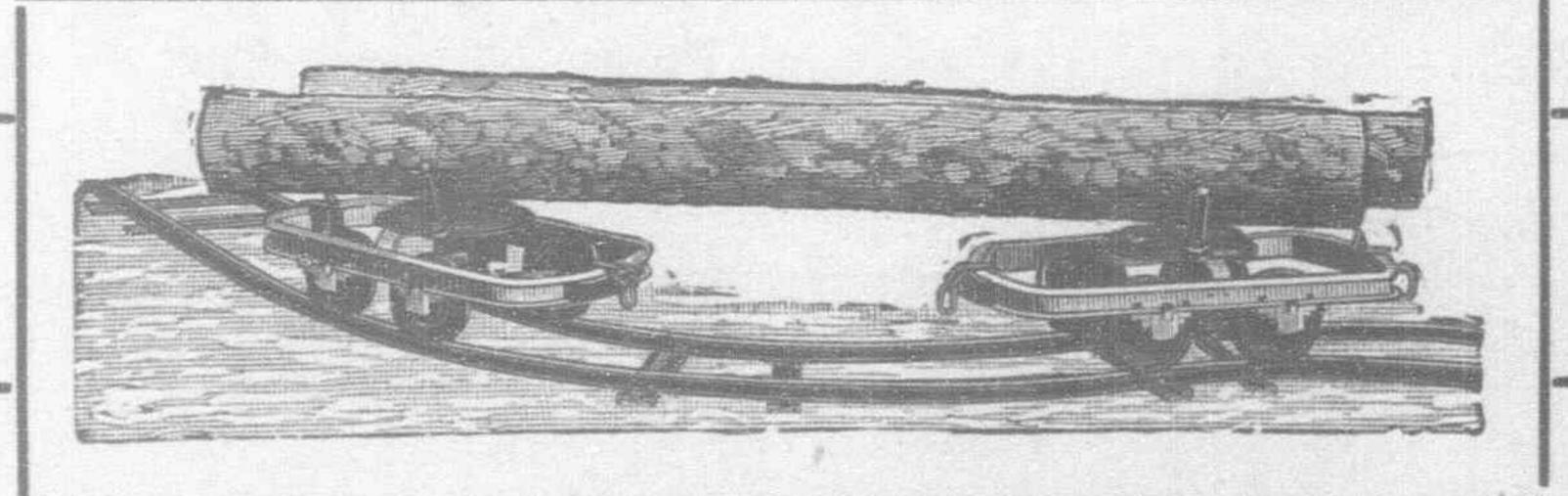
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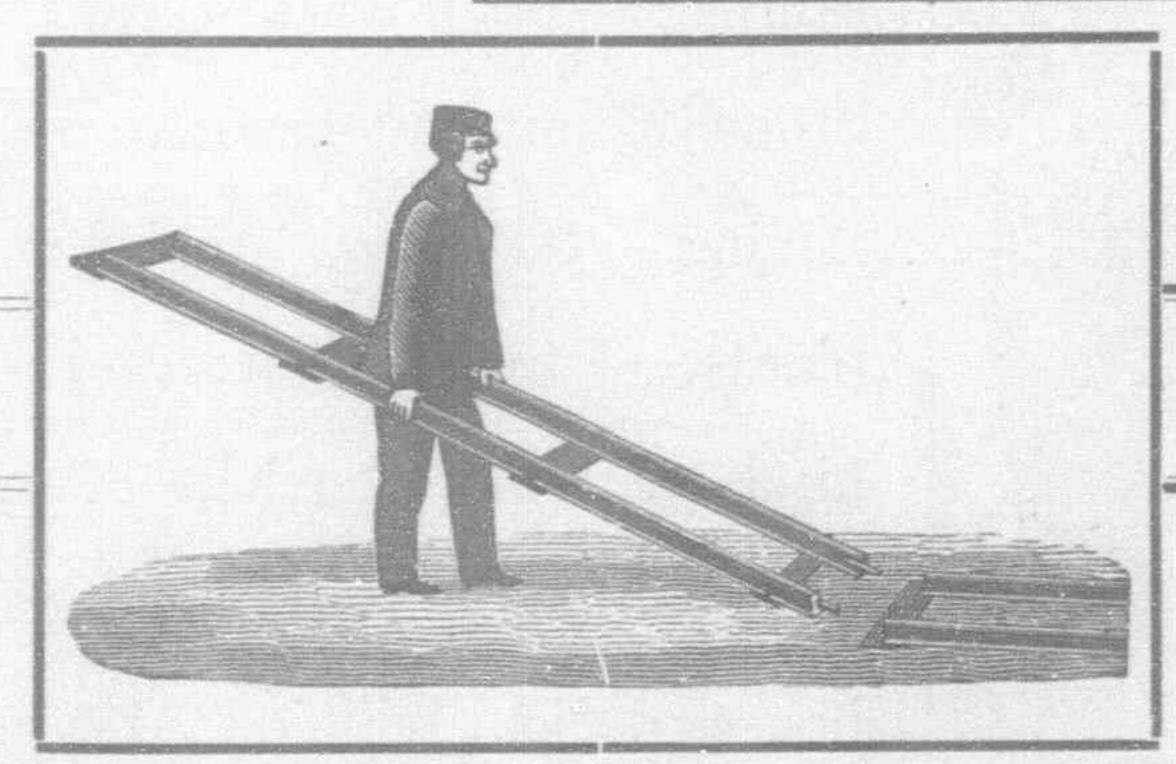
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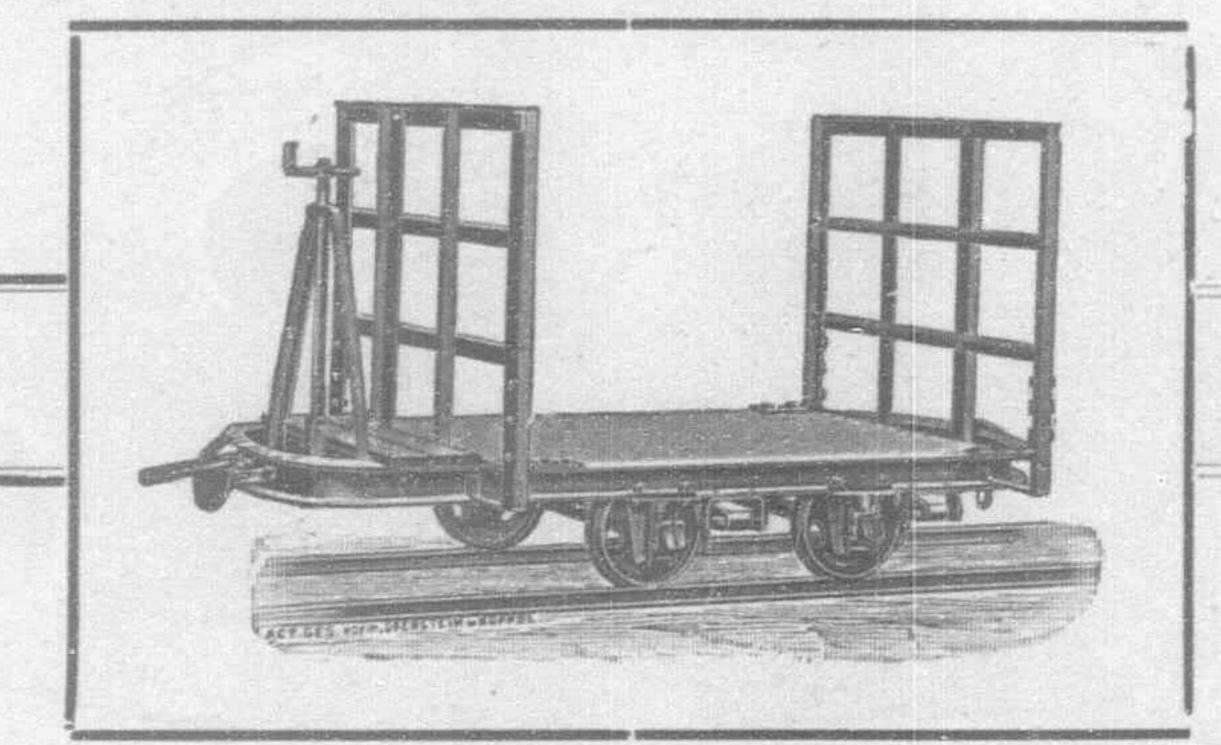
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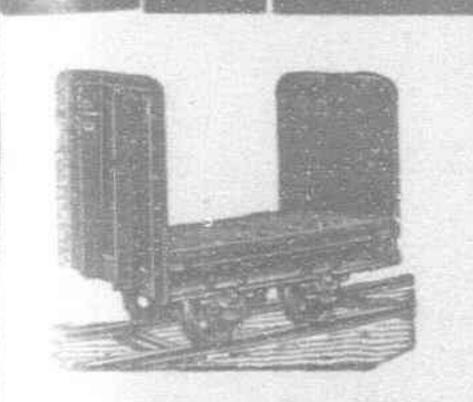


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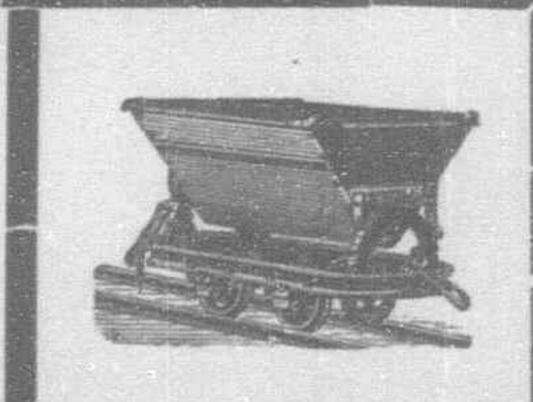
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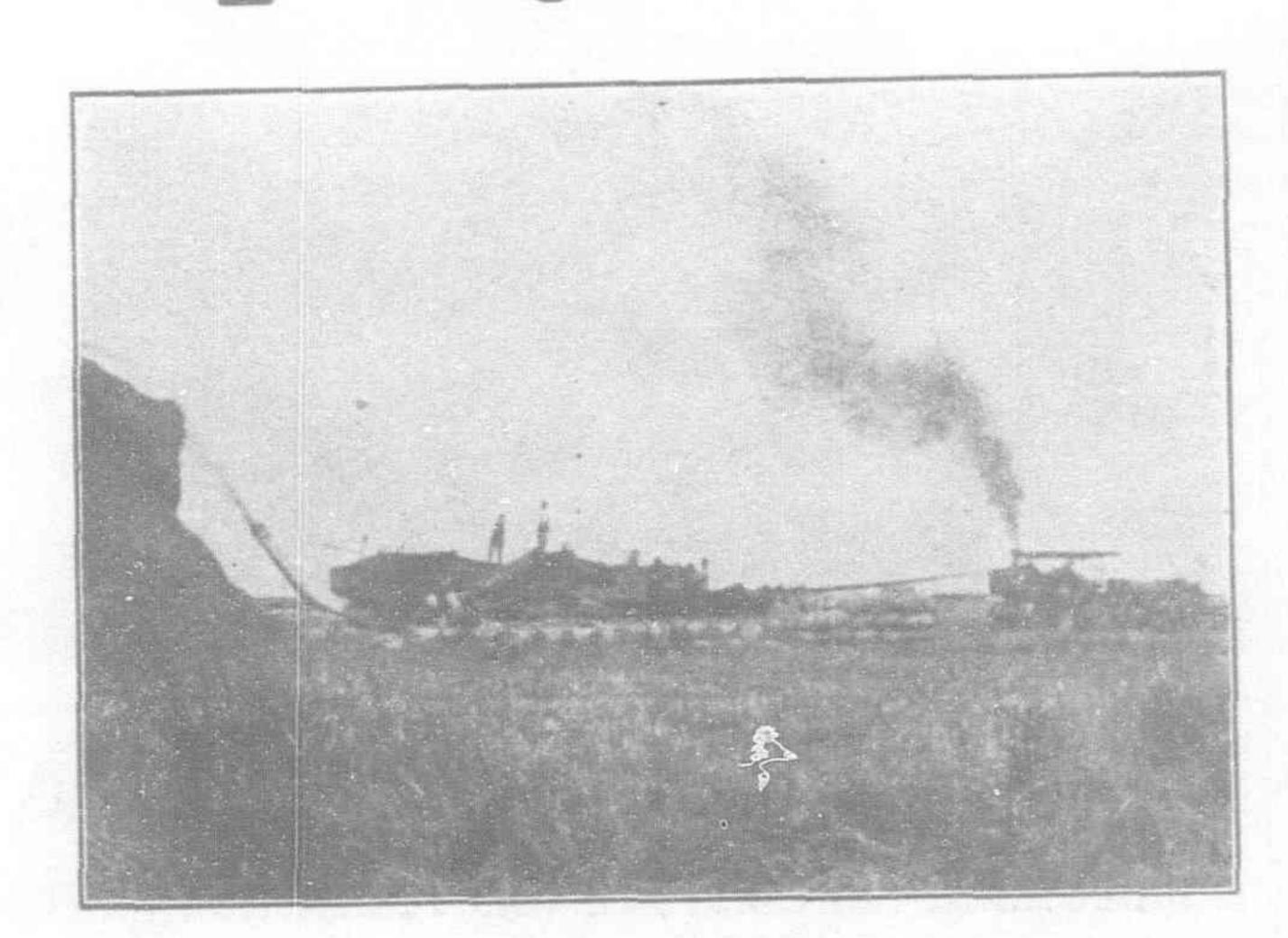
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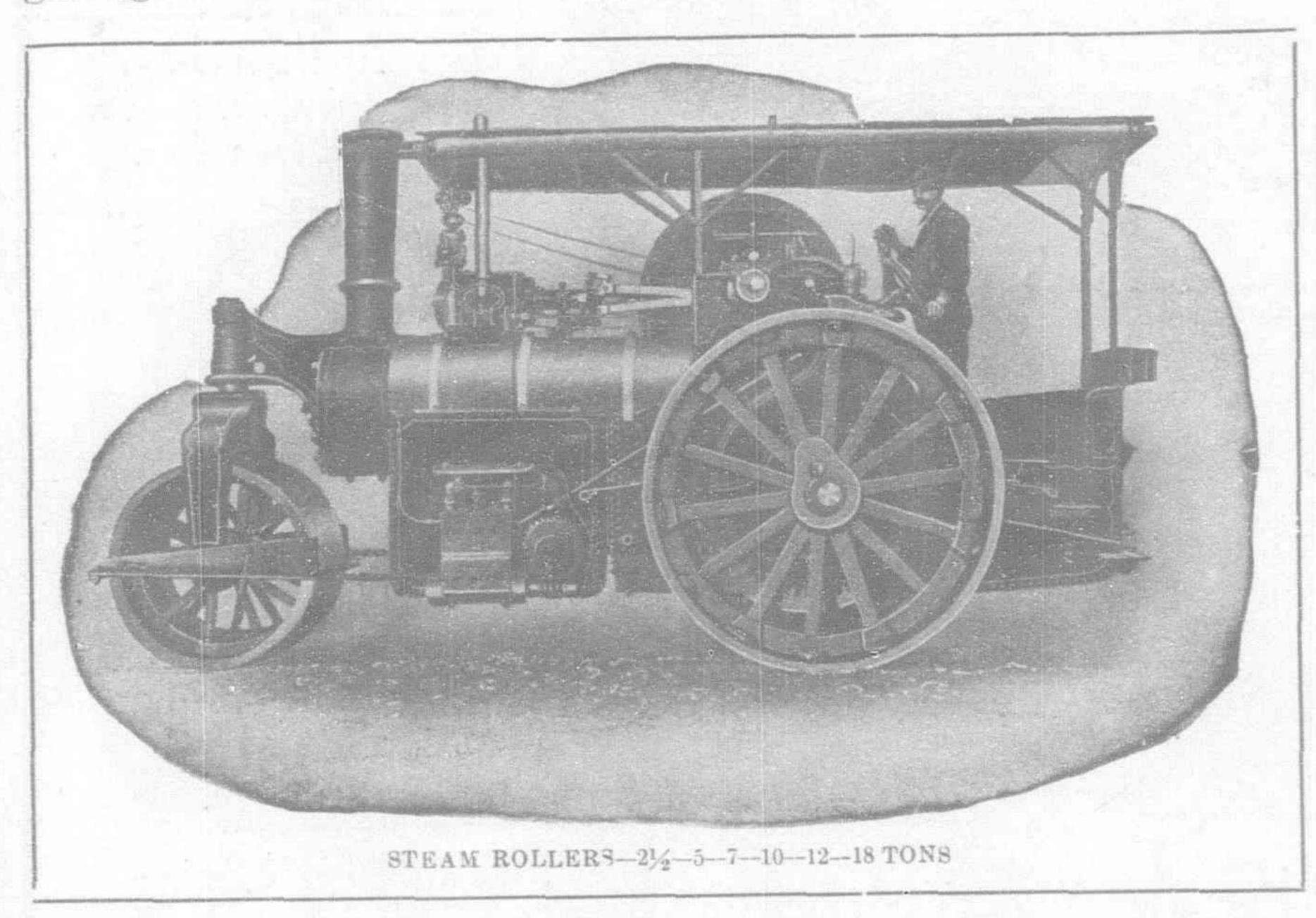
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	Y.		Y.	Y.							
Brett & Co., Limited	28,000	2800	IO	IO			30/6/03	6%	for I year	6.50 Sales.	
Club Hotel, Limited	185,000	1850	100	100			31/3/04			70 Nominal.	
Grand Hotel, Limited		2500	100	100		Y.6,179.25				225 Sales.	
Helm Bros., Limited		3720	50	50		Y.6,235.70				85 Sellers.	
Langfeldt & Co., Limited		1500	100	100		Dr.28,875.52				45 Sellers.	
C. Nickel & Co., Limited		20000	25	.25						34 Sales.	
Japan Brewery Company, Limited		9000	50	50	200,000	8,702.28				130 Sales.	
Yokohama Engine and Iron Works	The second secon	2600	50	50	20,000	Y.20,149.17	CONTRACT PROPERTY AND PROPERTY.	10%		120 Sellers	
Hirano Mineral Water Co., Ltd		5000	25	25			3,1,3	ist year		25 Sellers.	
Oriental Hotel, Ltd., Old Ordinary		1490	50	50			31/8/05	12%	,, I year	D	
New ,		1510	50	25			0-7-7-3	12/0	,, . , car		
,, Old Preference	251,000	750	50	50	60,542.50			8%	., I year	63 Sales.	
,, New ,,		1250	50	25	134-3			0/0	i, rycai		
, Founders	G	80	121/2	121/2				V an			
Oriental Consolidated Mining Co., Ltd	\$5,000,000		G.\$10		none			Y.37		500 Sales.	
		150,000	£I	18/10	none	G. \$672,093	31/12/04	G. \$1.	1, 1905	G. \$18 Sellers.	
Raub Australian Gold Mining Co., Ltd	£ 200,000 {	50,000	£I	51	£4,873	Dr. £8,745	31/3/05	48 cts.	,, 1901	\$3 Sales.	

DEBENTURE LOANS.	AMOUNT OF LOAN.	FACE VALUE OF DEBENTURES.	RATE OF INTEREST.	INTEREST PAVABLE.	CLOSING QUOTATION.
Japan Brewery Company, Limited	200,000.00	100.00	7%	I April and I October.	108 Sales.
Brett and Company, Limited				나는 그 사람들이 살이 살아왔다면 내 목 중에 들어가는 살이 되었습니다. 이 목소에 보는 것 같은데	85 Sales.
	11,500.00	100.00	7%	I June and I Dec.	
Yokohama United Club	250,000.00	100.00	7%	30 June and 31 Dec.	108 Sales.
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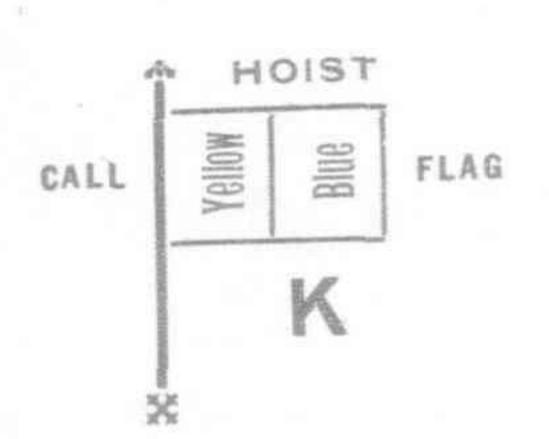
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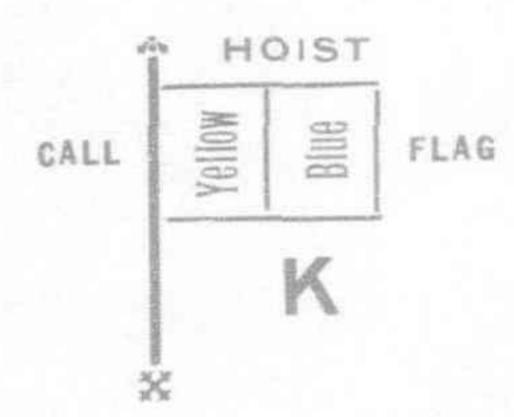
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			and the same of

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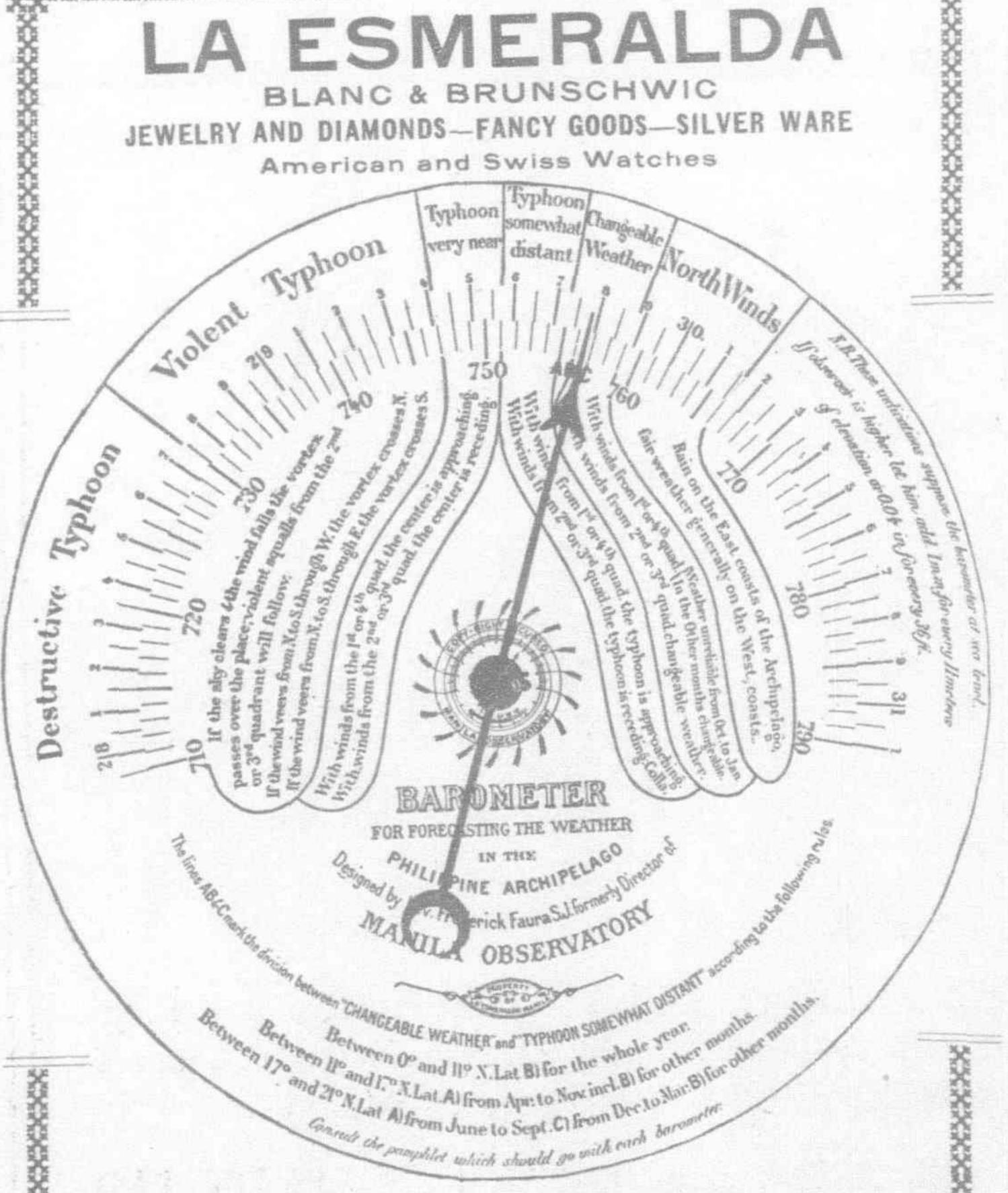
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Vol. I.

JULY 15, 1906

No. 6.

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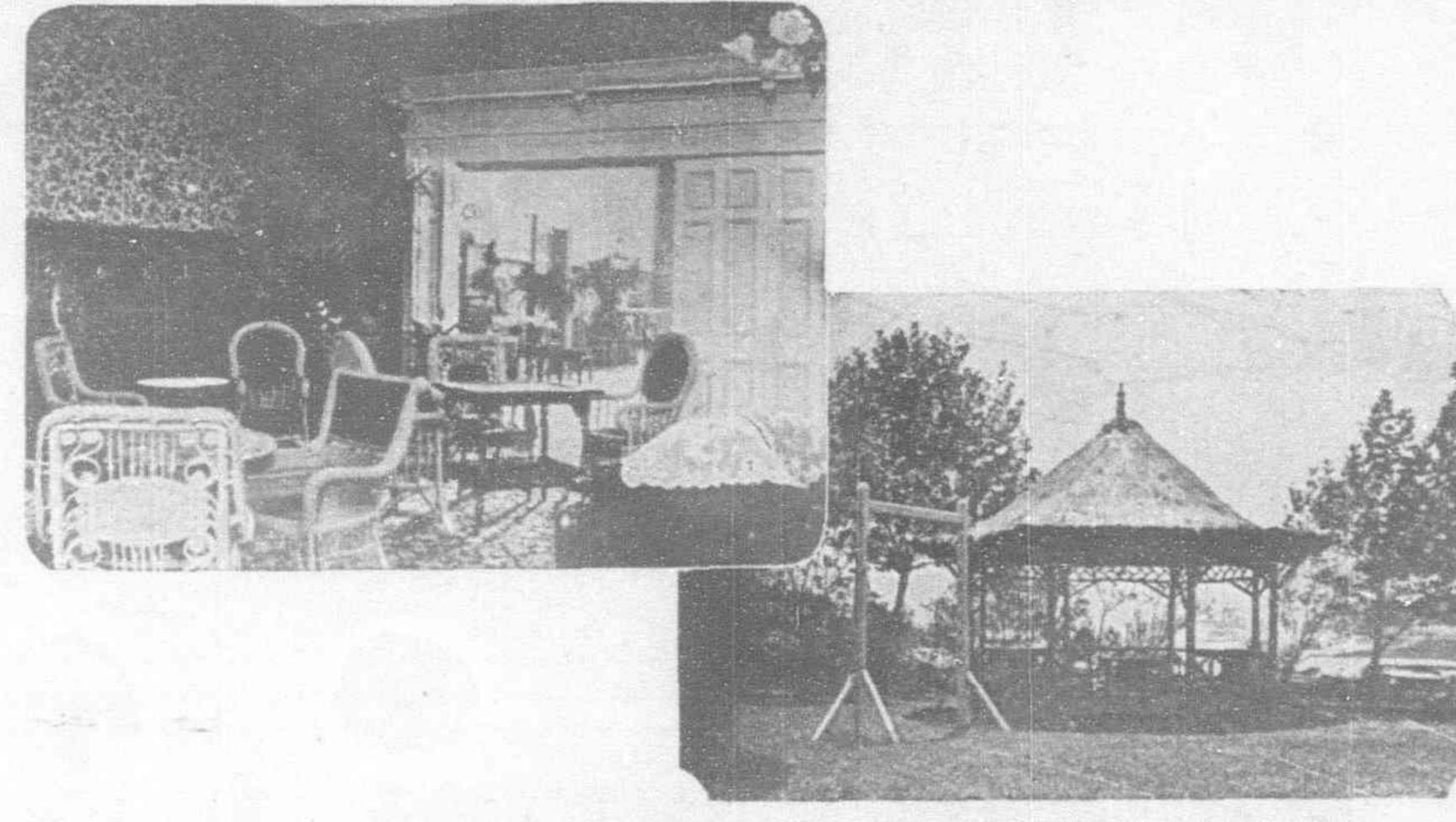
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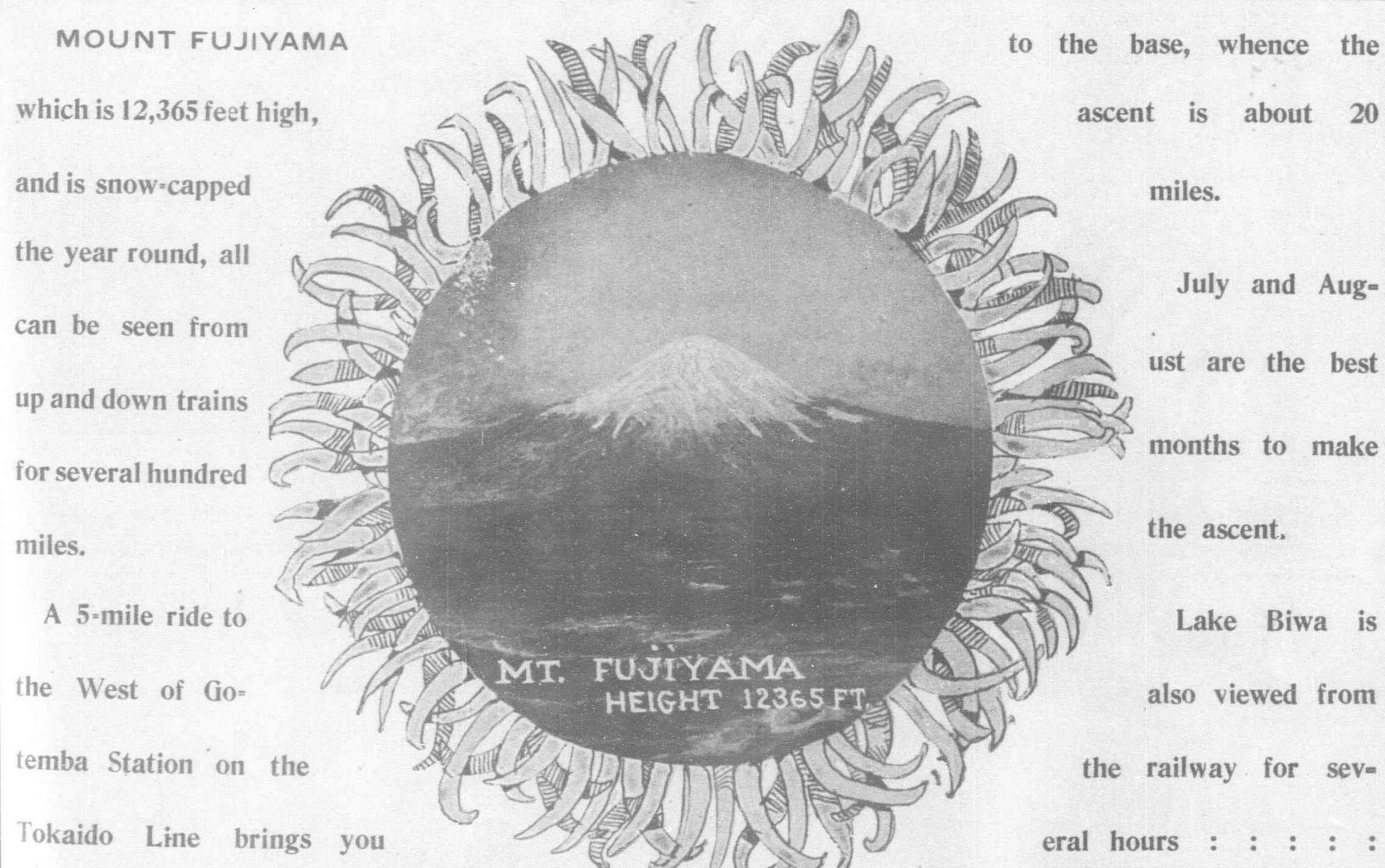
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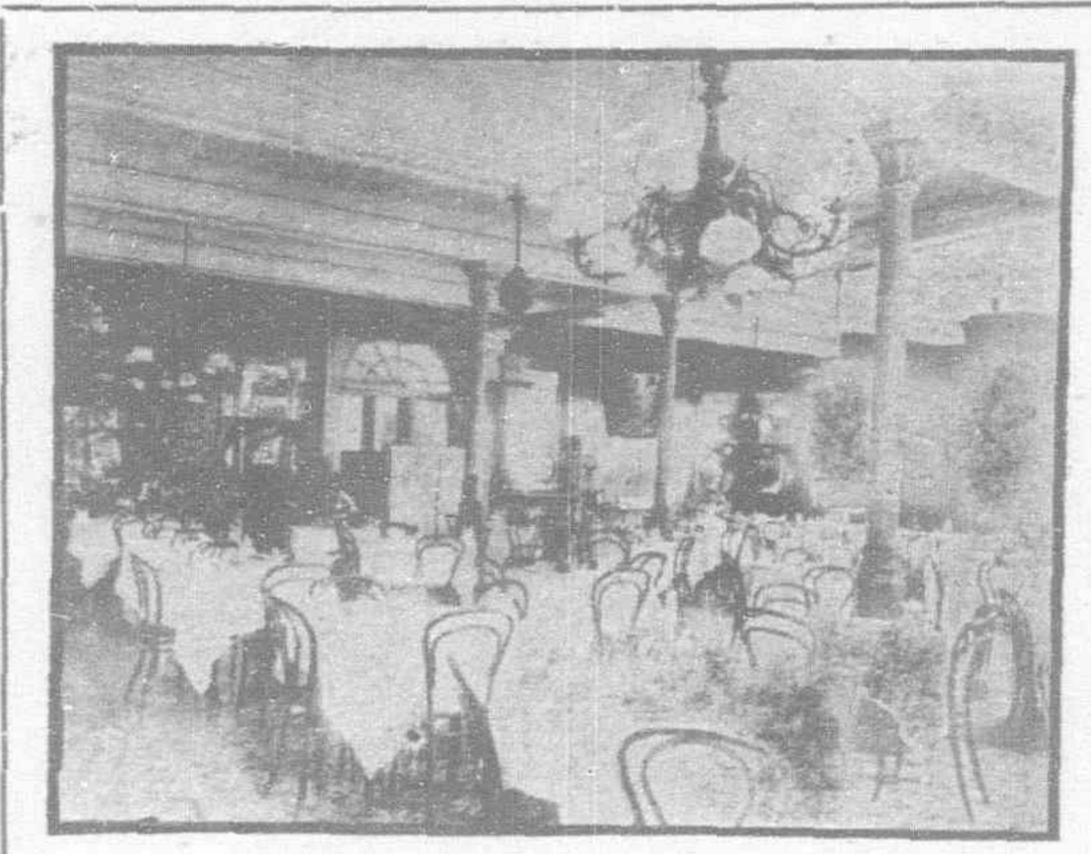
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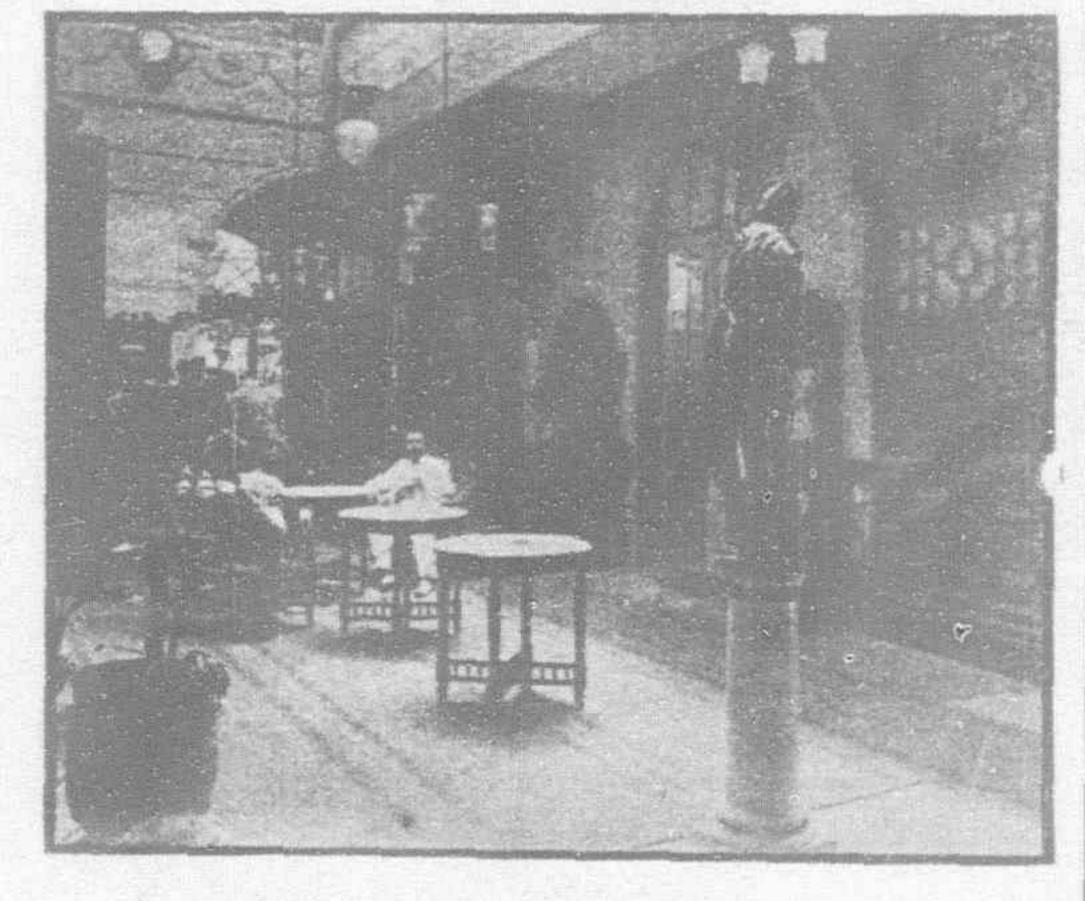
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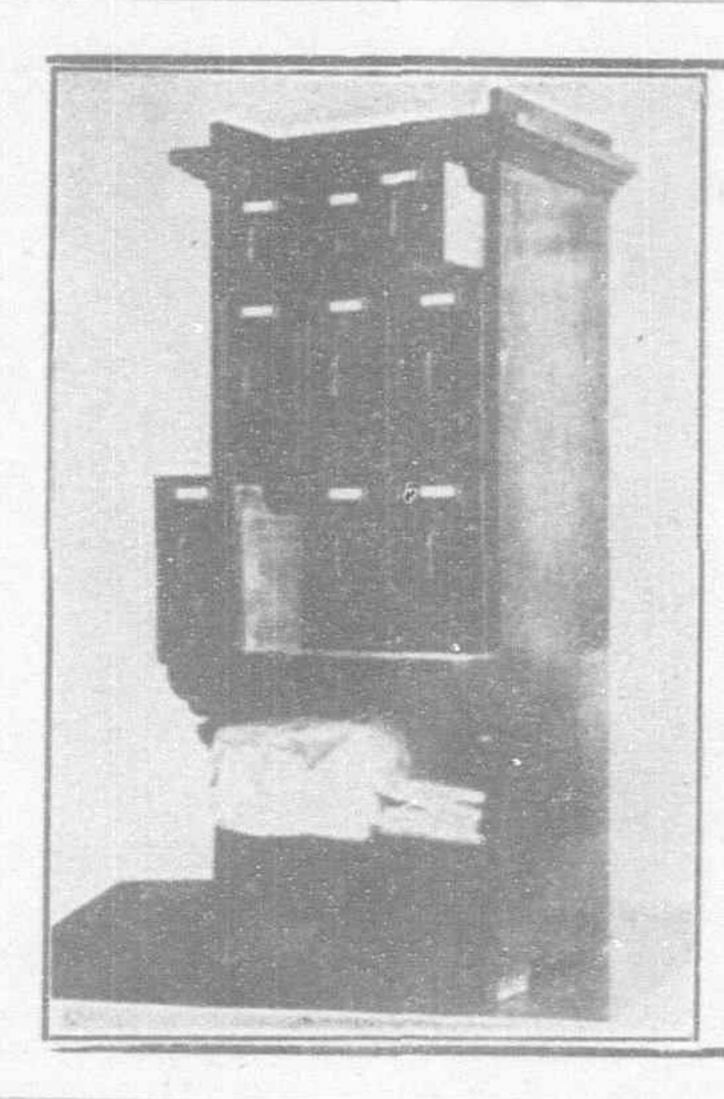
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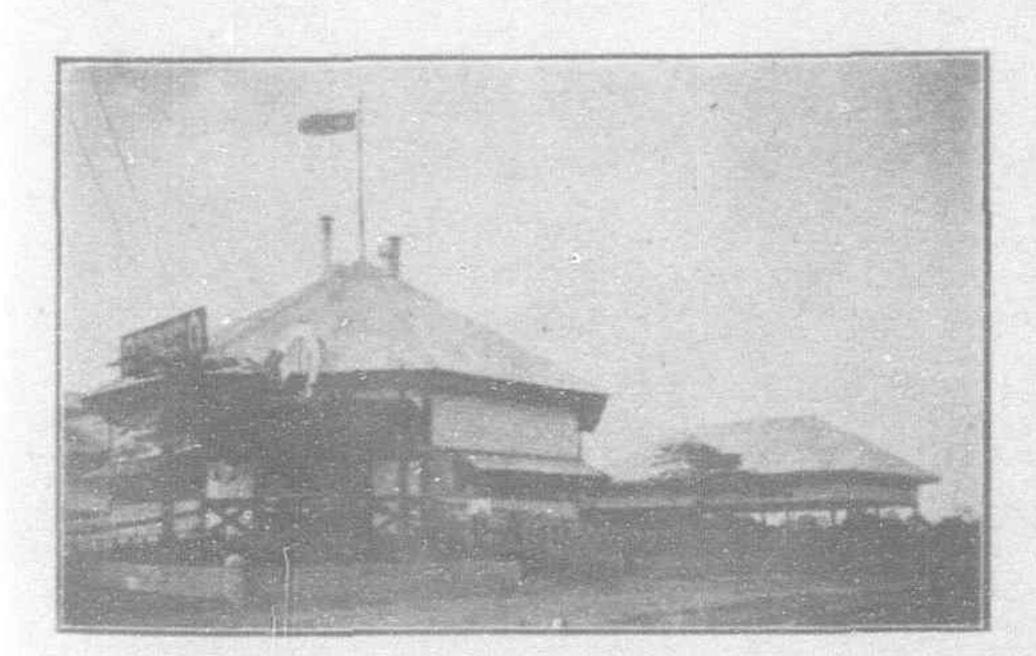
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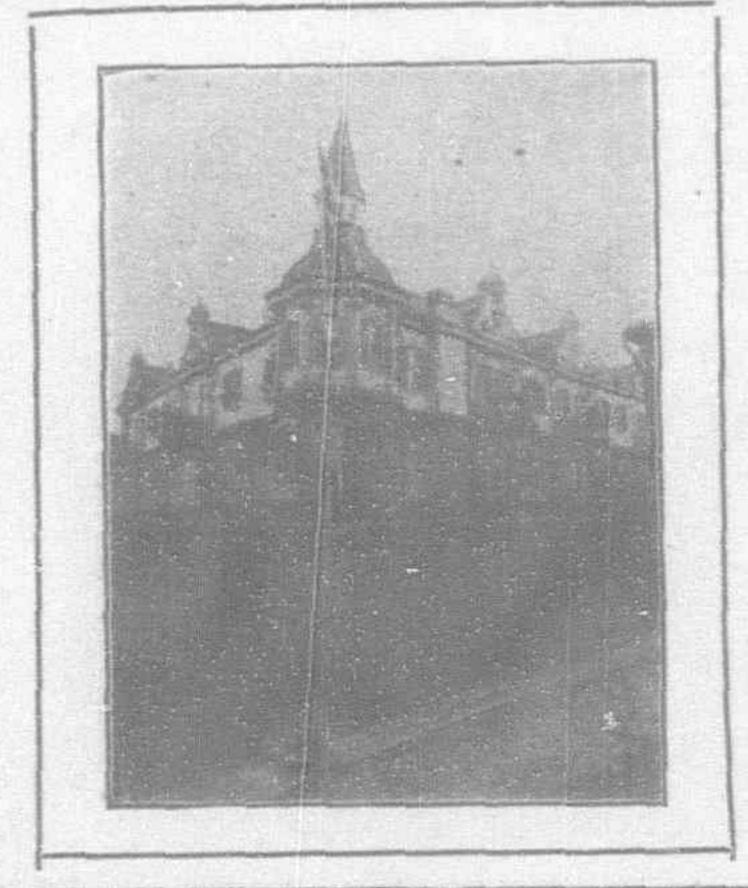
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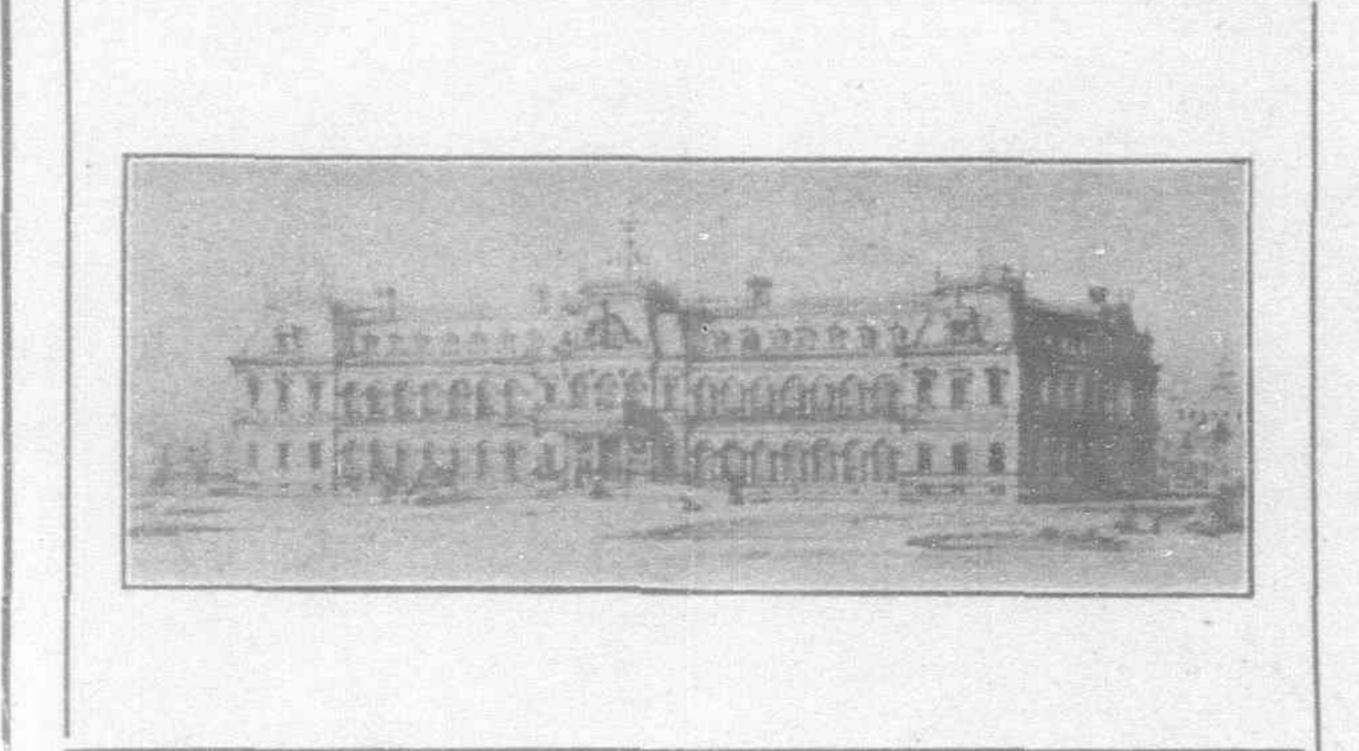
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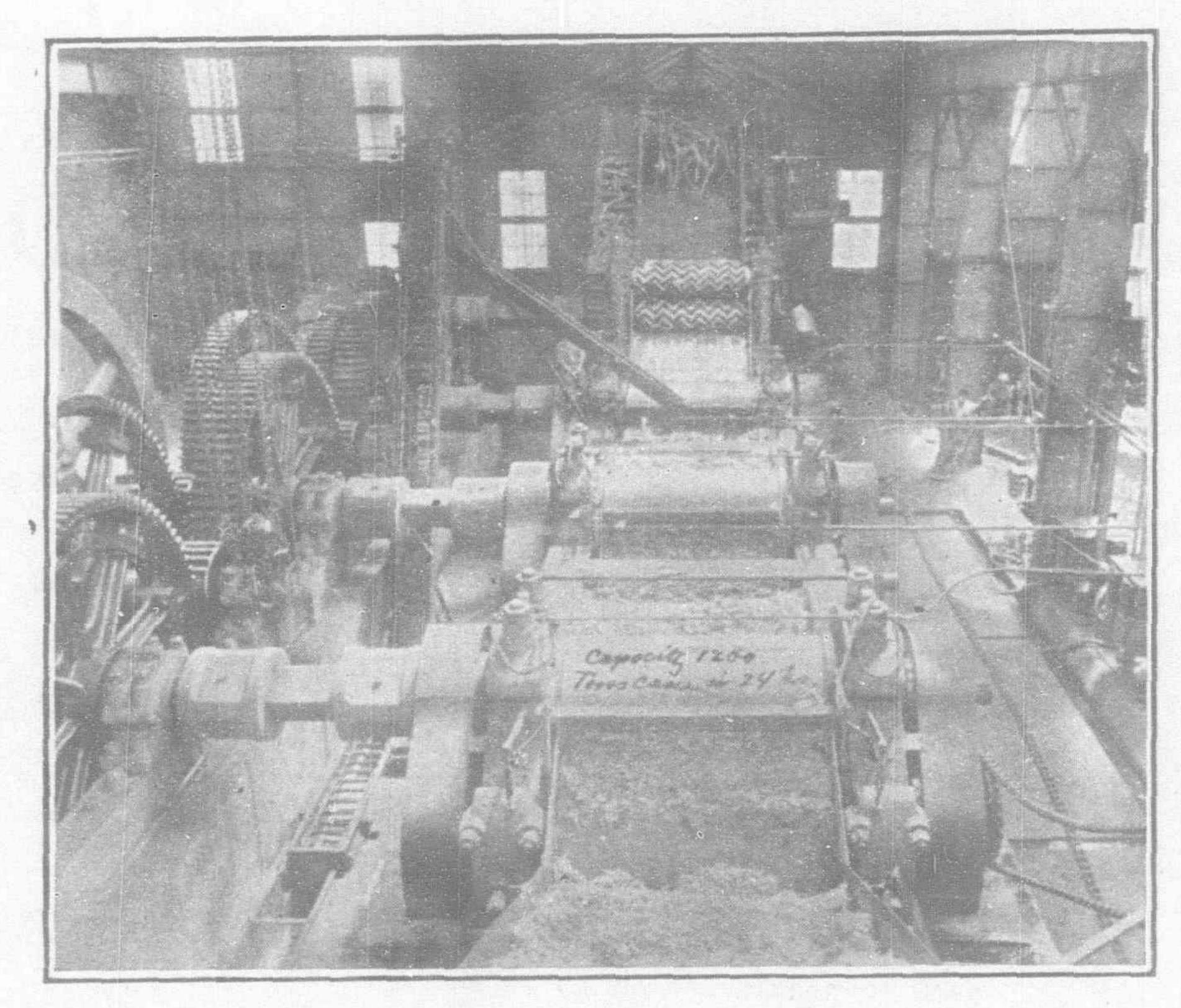
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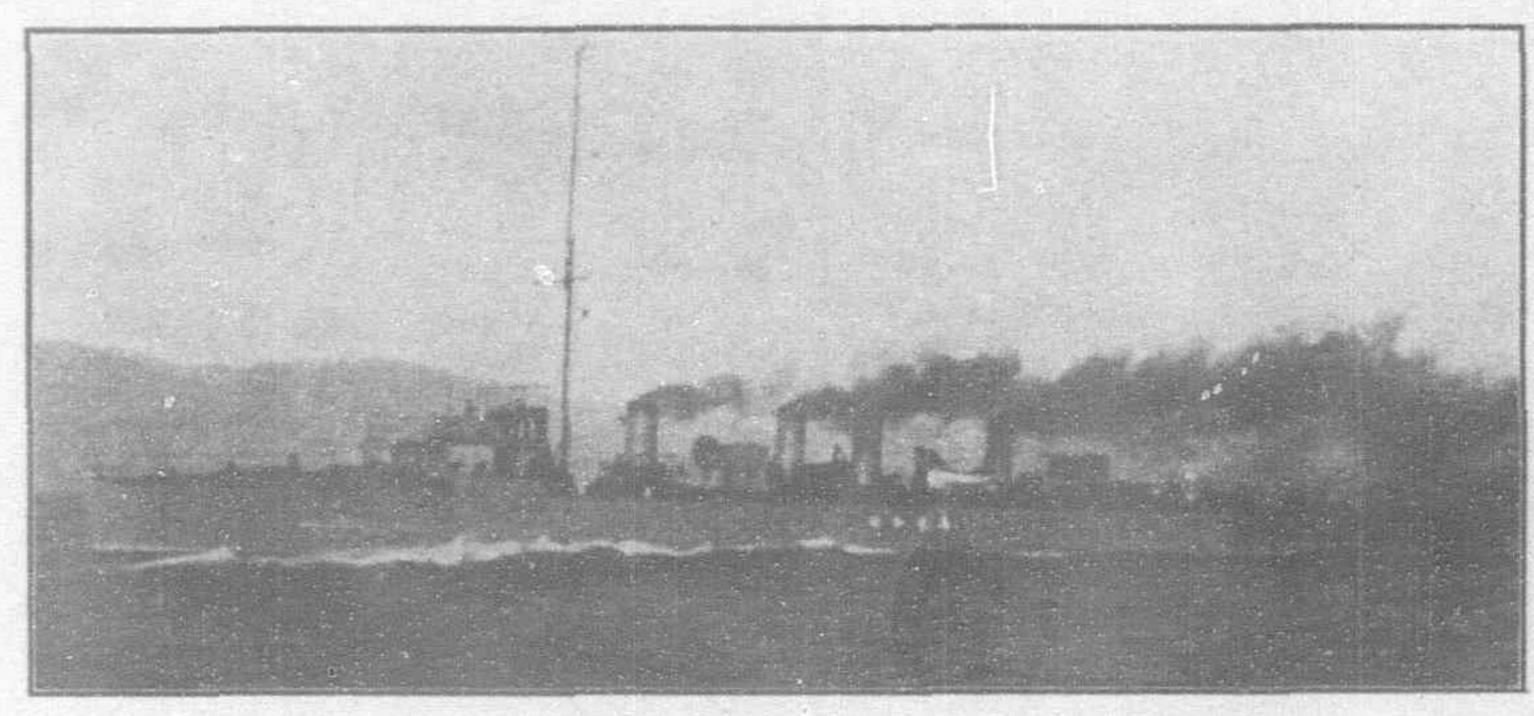
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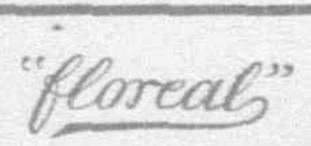
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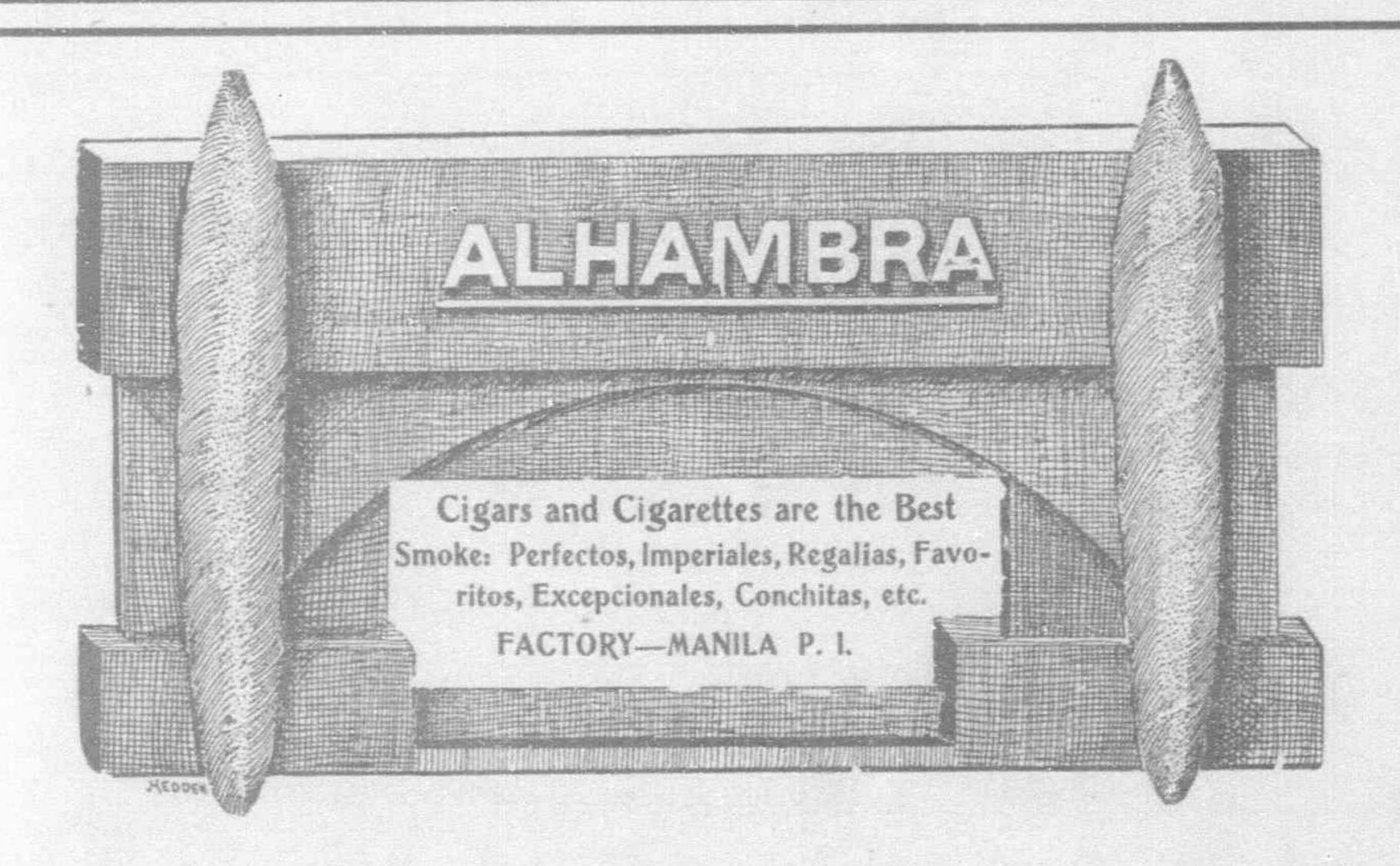
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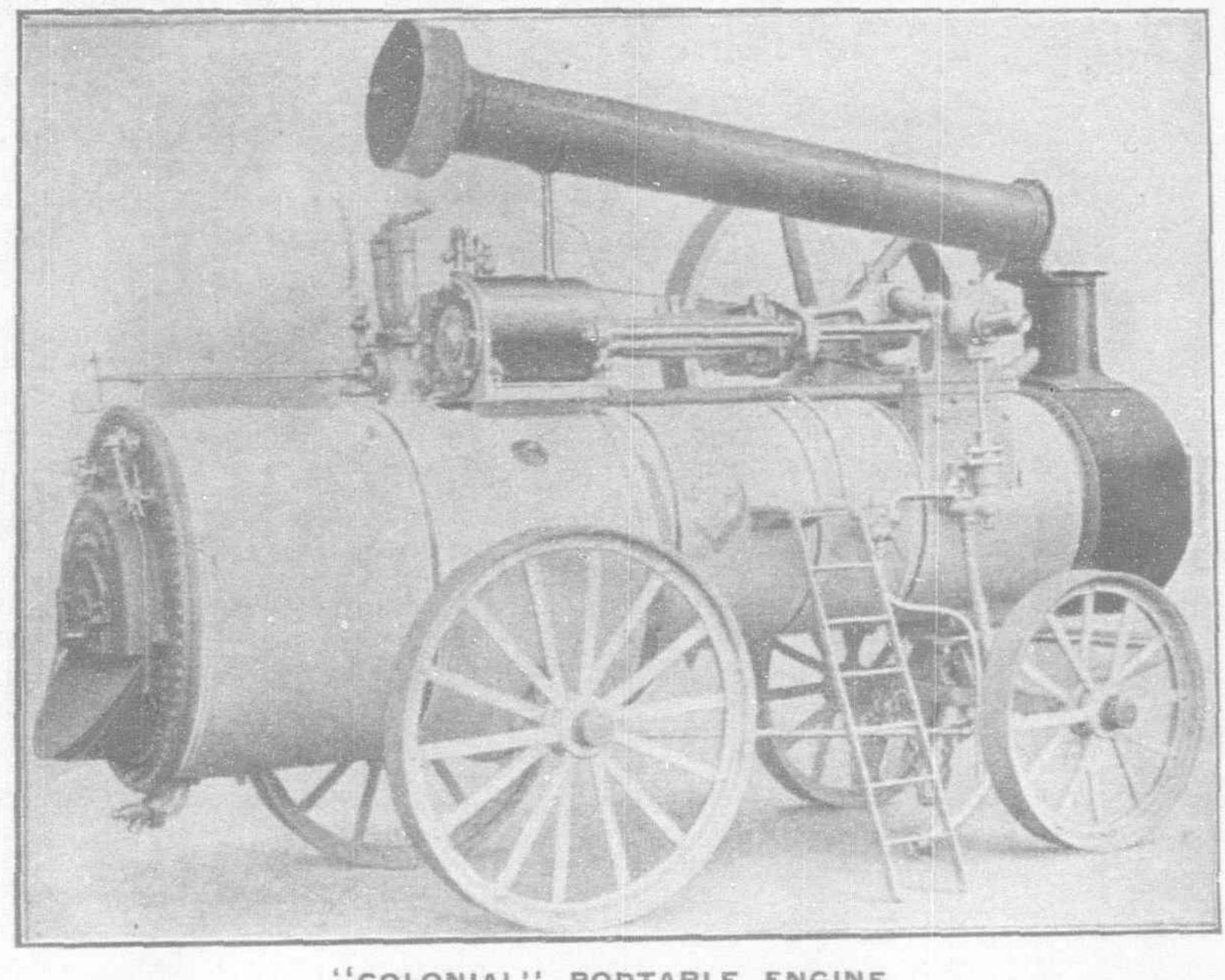
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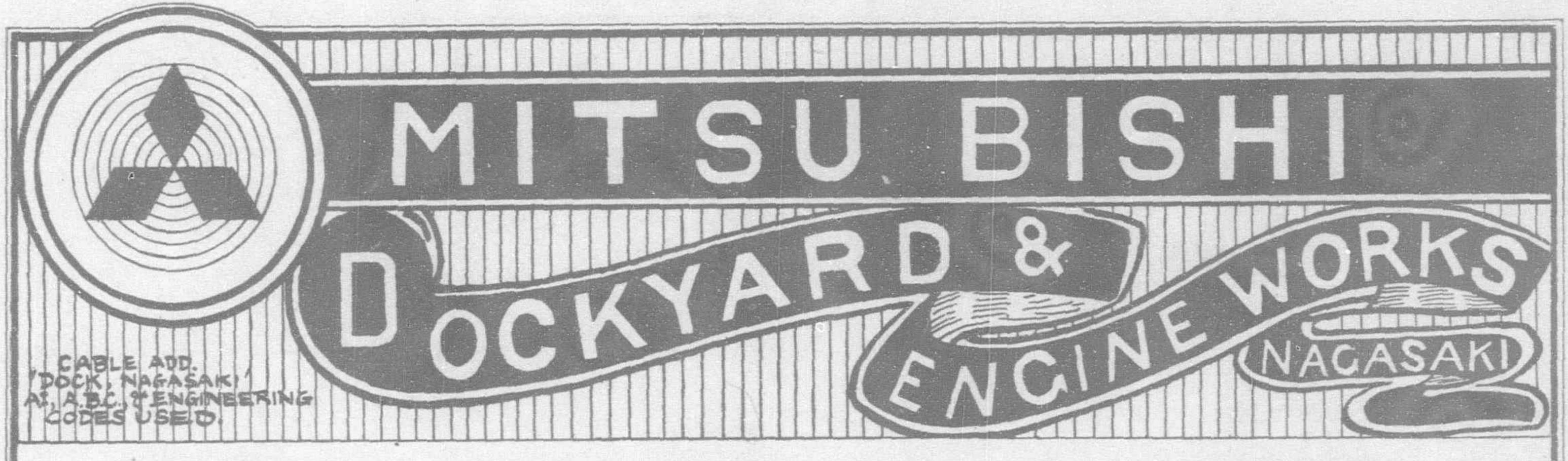
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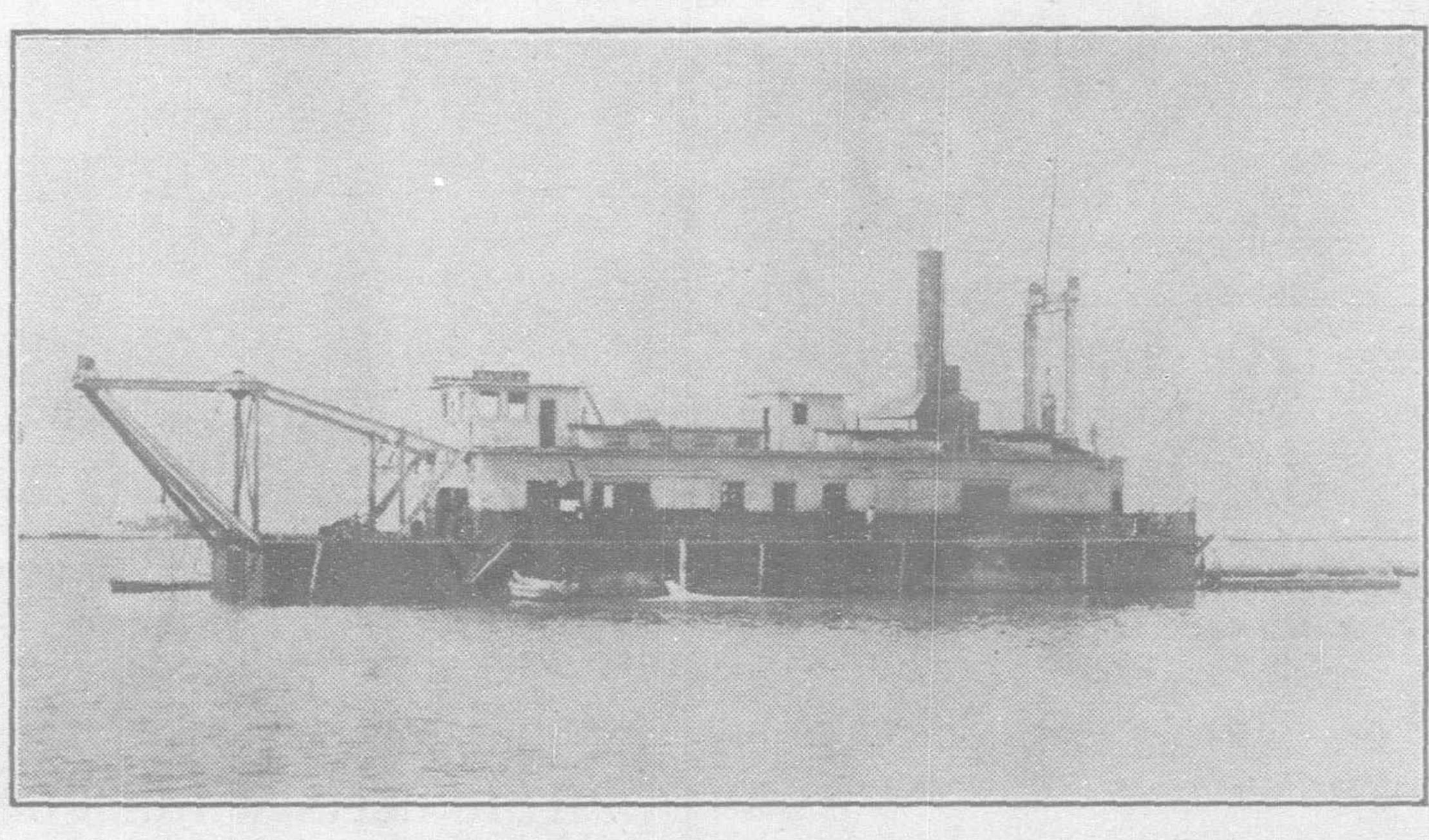
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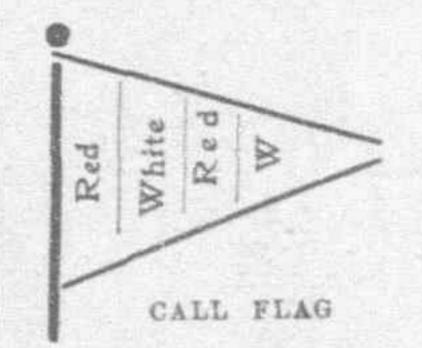
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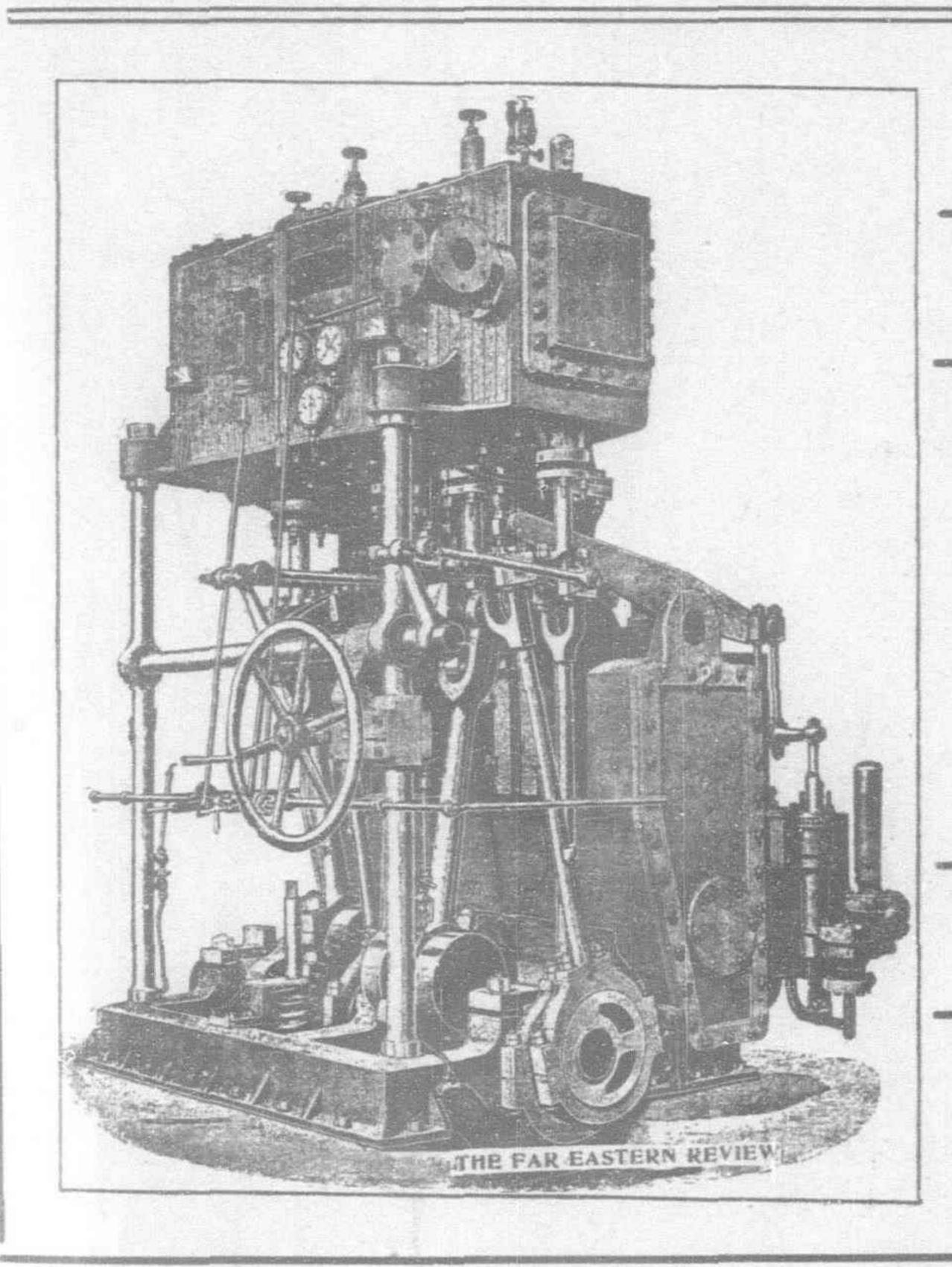
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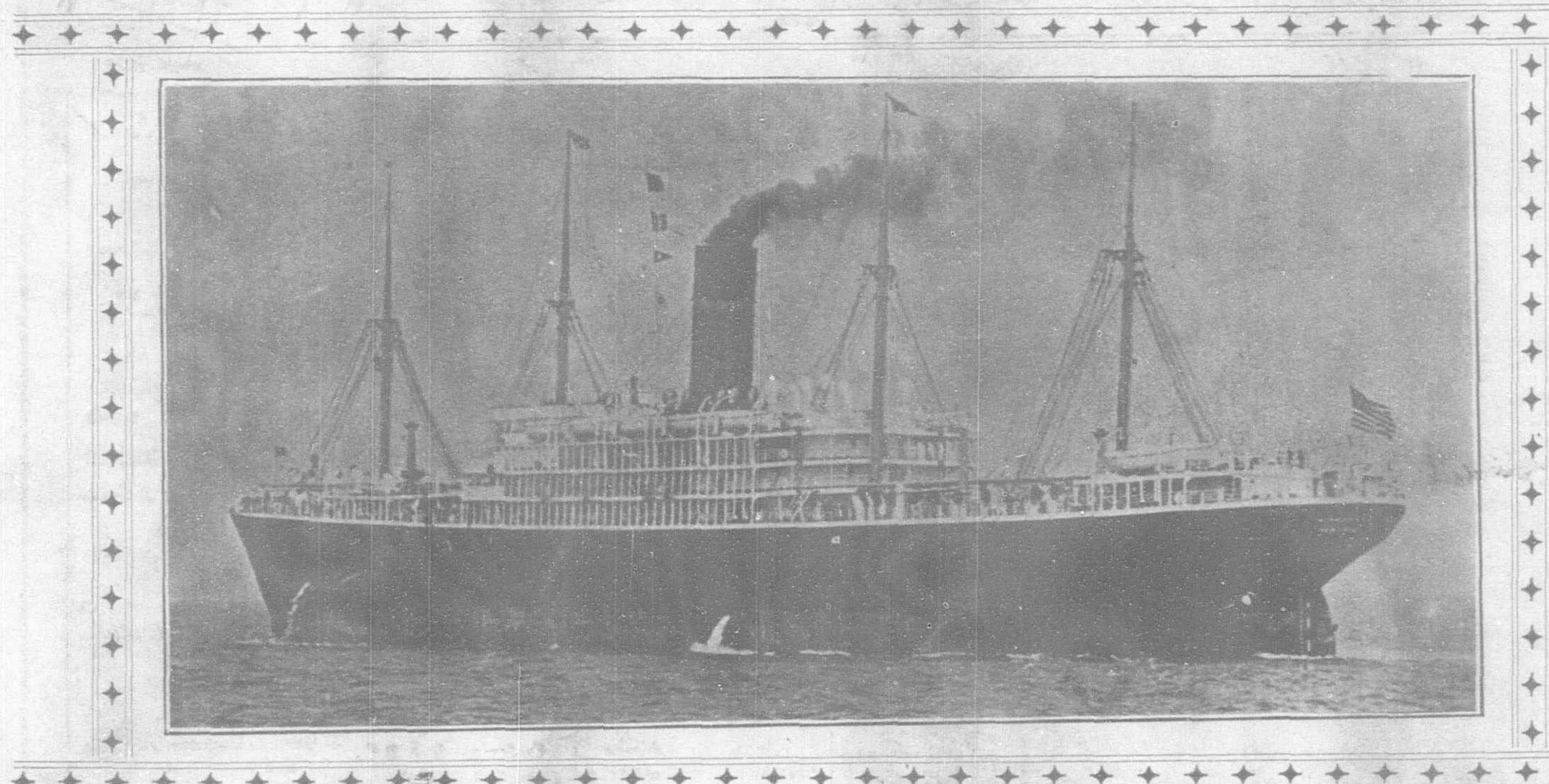
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